TELEPHONE ENGINEER

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MANAGEMENT • ENGINEERING • MAINTENANCE

JUNE
1936

Cover Illustration

COMMUNICATIONS AT THE POLITICAL CONVENTIONS
Courtesy, Bell Telephone News
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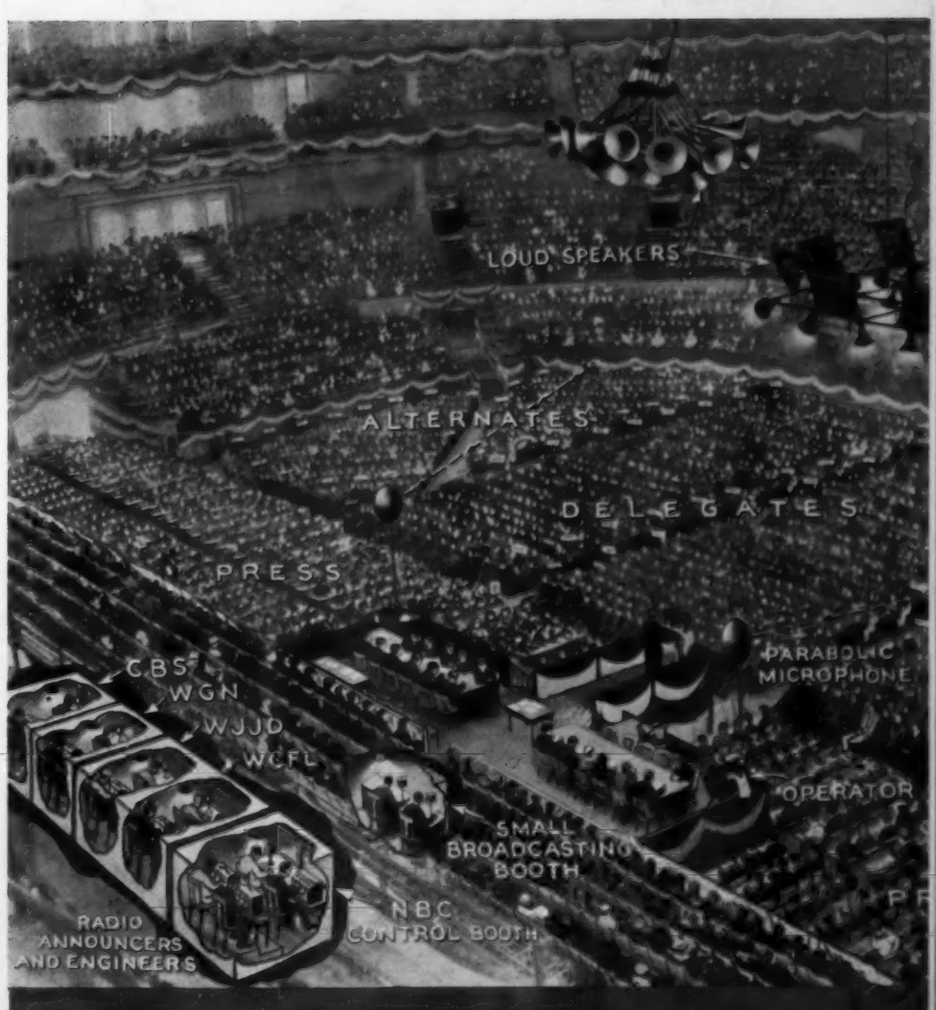

Communications at Political Conventions

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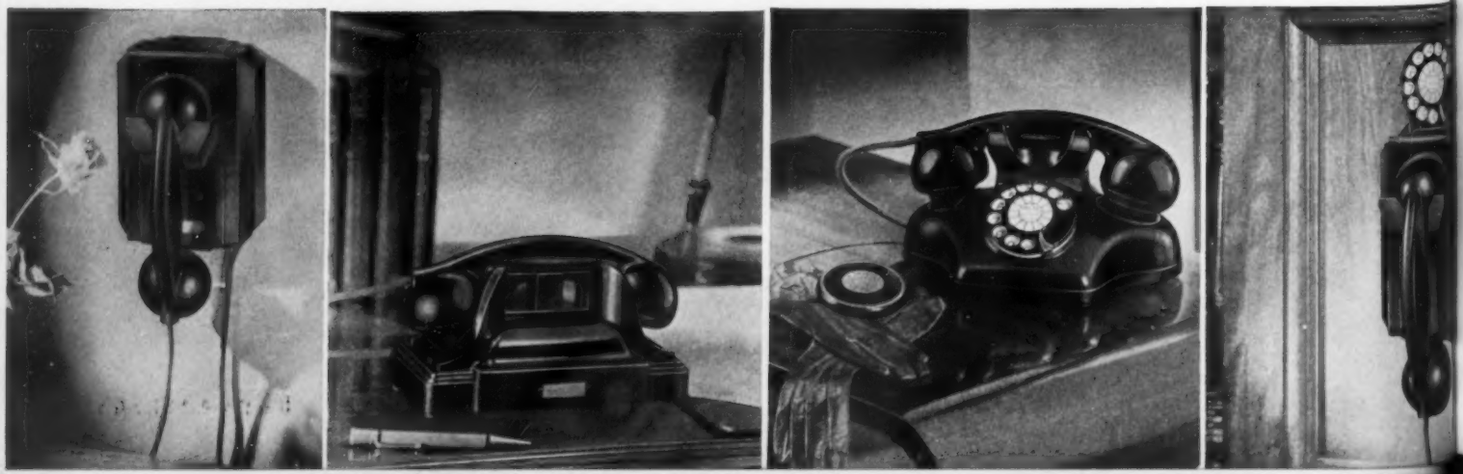

TELEPHONE ENGINEER

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30-DAY LIFE FOR READERS AND ADVERTISERS

MANAGEMENT • ENGINEERING • MAINTENANCE

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THE POLICY OF THE TELEPHONE INDUSTRY

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THE TELEPHONE INDUSTRY in 1935—

- **Employed 335,000 persons.**
- **Paid $427,000,000 in salaries and wages.**
- **Paid $104,000,000 in taxes.**
- **Paid $193,000,000 in dividends to 800,000 stockholders.**

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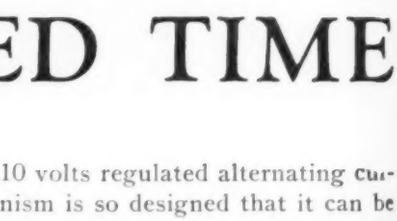

TELEPHONE ENGINEER
MANAGEMENT · ENGINEERING · MAINTENANCE

JUNE, 1936

"Tapping In" On Washington

By ROLAND C. DAVIES
Editor
Telecommunications Reports

● With the additional appropriation of $400,000 approved by Congress, the telephone investigation of the Federal Communications Commission will be continued to February 1, 1937, at least. However, hearings in the inquiry have been scheduled to be recessed in mid-June until September.

When the hearings are resumed in the Fall, it is a possibility that the probing into affairs of the American Telephone and Telegraph Co. and Bell System by the FCC may be fitted into a phase of the political campaign, particularly if the Roosevelt Administration should be centering its fire on "fire business" as it has on a number of occasions. Up to the present the investigation has not made any vehicle for the campaign and both the White House and Congress have displayed no public reaction to the proceedings by the FCC.

The $400,000 additional appropriation for the investigation was passed by both the Senate and House without even being mentioned during the debate of the deficiency bill on the floor of both chambers of Congress. Towards the end of June the Commission's original fund of $750,000 will be exhausted so it was absolutely essential to have a further allotment to continue the inquiry. The $400,000 appropriation will be sufficient to continue its investigation until next February with a depleted staff of investigating experts, accountants and engineers. Telephone Division Chairman Paul A. Walker of the FCC cited that the present staff of 260 will be decreased by 30 per cent after July 1 which will mean that a staff of 180, or about half of the peak corps of 325 of the past Winter and Spring, will engage in further probings of the Bell System. On the basis of the diminished investigating staff, it is deemed very likely that the remainder of the FCC inquiry will be confined solely to the American Telephone and Telegraph Co. and Bell System, and will not delve into the Independent telephone industry, except for occasional forays in the Independent manufacturing field in an attempt to give some foundation to the commission investigators' charge of Western Electric domination over the Independent manufacturers.

Publicity in Rate Cases

The first week in June, the resumed hearings in the investigation featured a strenuous effort by Samuel Becker, FCC special counsel, to unfold the comprehensive and many-faceted campaign of publicity used by the Bell System in a number of states during the post-world war period to mold public opinion so state commissions would be influenced to increase telephone rates. Many times, the FCC special counsel seemed to indicate in his questioning that methods of canvassing subscribers to get their views on the rate increase which had been approved by the state commissions might illustrate a defect in telephone regulation. The principal American Telephone and Telegraph Co. witness, E. S. Wilson, vice-president in charge of public relations in the early twenties, however, failed to agree with any such interpretation and felt that no state commission would grant rate revisions except on the facts and merits of the case, although he admitted that the views of the public would naturally be given consideration.

● The many-sided publicity campaign for the rate increases included the enrolling of Bell System and Western Electric employees to canvass subscribers on their views of the rate situation. Other phases of the campaign were: the wide-spread use of newspaper advertising; news stories; and submission of "suggested editorials" to editors; a barrage of pamphlets and bill inserts sent to subscribers; addresses on the rate situation before chambers of commerce, civic organizations and business groups with attempts to secure the passage of resolutions by those bodies for presentation to state commissions; and special efforts by Bell company presidents to have concerns which sold supplies to Western Electric and bankers appear before state commissions to advocate rate boosts. Investigation Counsel Becker tried to develop through frequent questioning that the canvassing of subscribers by company representatives was a one-sided presentation of the rate question because rate of return, depreciation, and operating

costs with such elements as license contract payments were most complicated and difficult to understand for the "average person" who therefore could not accurately endorse a rate increase on its merits. The FCC counsel also drove home points that the enrolling of bankers and firms which sold to Western Electric was using "interested parties" to fight for the rate increases.

Situation After War

A. T. & T. Vice-President Wilson defended the procedure of canvassing the public on rate increases as a proper method of presenting the telephone company's needs and problems to the subscriber. He cited that subscribers would study the facts about the company in its quest for rate increases because it "hit his pocketbook." One exhibit cited that in Michigan 36,000 subscribers had been seen, while in several states, Wisconsin, Nebraska, Michigan and Montana the commissions had approved the forms of the subscribers' petitions and even the presentation of the case to the public.

● The Commission was told by the A. T & T. official that in the post-world war period of 1920-21 the telephone industry was confronted with the most serious situation in its history—with high and mounting expenses and revenues based mainly on pre-war rates which produced a low return. At the close of 1921 subscribers had sought nearly 500.-000 telephone stations which had not been installed; the payroll of the Bell System had risen from $156,000,000 in 1918 to $274,989,000 in 1921; the average rate of return for the system was 3.8 per cent in 1920; and A. T. & T. stock between 1918 and 1920 was selling below par. Increased revenues were mandatory for the improvement of telephone service and maintenance of good employee forces, he stressed.

To Probe Publicity Expense

Two phases of the three-day hearings during the first week of June loomed as possible subjects of future FCC regulation — the expenditures for advertising and publicity and for club and organization memberships of employees which were characterized by Commissioner Walker as coming from the rate payer. Chairman Prall of the Commission launched the idea of securing the total expenditures for advertising and publicity and Special Counsel Becker said that a questionnaire to all Bell System companies on these costs would be sent out. The FCC counsel developed that from 1925 to 1934 the Bell System had expended $4,848,000 for employees' memberships in clubs, civic organizations, chambers of commerce and scientific and professional societies.

● One disclosure during the week appeared a likely feature of a future FCC report to Congress when it was revealed that Thomas R. Shipp, Washington public relations expert, had been paid $86,-000 for an Indiana telephone survey between 1920-25 and $169,000 for a 1921-31 Pennsylvania telephone rate campaign. Testimony and exhibits in the form of photostatic copies of letters and reports from A. T. & T. files revealed that Shipp had had close contacts with Indiana public officials, including the governor, state commission and both Democratic and Republican leaders, and with the newspapers there and in Pennsylvania had been able to get advance information about a decision on rates from the state commission. FCC Counsel Becker stressed that Shipp was engaged not solely to obtain public opinion on the telephone service in those two states where a rate revision proceeding was under way.

Two other witnesses in this FCC's propaganda probe were Ralph E. Marburger, Ohio Bell vice-president in charge of public relations, and James M. Hamilton, director of the A. T. & T.'s motion picture bureau. Mr. Marburger came under fire for a publicity campaign among subscribers and in newspapers on the state-wide 1924 rate reduction order of the state commission which is now before the state supreme court. Aggressive FCC Counsel Becker revealed that Bell System employees were given intensive instruction about the company's financial position and the effect of the rate reduction so they could spread such information to subscribers, while pamphlets were sent monthly to subscribers with their bills or in separate enclosures.

Criticizes Chain of Newspapers

The most sensational development of Mr. Marburger's testimony came when a report by his public relations department assailed the Scripps-Howard newspaper chain in Ohio for its "harassing attacks" on the telephone company with misuse or unfair use of facts in a circulation building effort. The report, which was one of the exhibits taken from the Ohio Bell files, termed 90 per cent of the newspapers in Ohio favorable to the telephone company, but it was developed that this view was predicated on a basis of "no news is good news". The Scripps-Howard newspapers were depicted in the report, which had been approved by Mr. Marburger, as "self-righteous" in upholding the cause of the "working man" but motivated in their crusades to build up mass circulation. Mr. Marburger in his testimony declared that he felt the Scripps-Howard newspapers presented facts about the telephone industry inaccurately and unfairly. In another statement the Ohio Bell official expressed the view that it was not greatly reprehensible to take a newspaper editor an advertisement and press releases at the same time. He felt that newspaper editors would publish releases when the news contents justified publication and the Bell System publicity representatives felt that editorial judgment alone should decide publication of news items.

● Both Mr. Wilson and Mr. Marburger were grilled at length by FCC Counsel Becker as to whether they did not think the Bell System had a better opportunity to present its side to the public in rate controversies than have state commissions and the telephone subscriber. The two witnesses disagreed with that contention, citing that commissioners, state and city officials often made speeches and got wide publicity for their efforts to secure rate revisions. Counsel Becker then tried to get admissions that the telephone companies were able to publish more pamphlets and literature than the public side.

Allegations about the Bell System motion pictures being propaganda of a sinister type for use in rate controversies in swaying public opinion were vigorously and rather effectively countered by Director Hamilton of the A. T. & T. motion picture bureau. Counsel Becker tried to show that the film "Getting Together" on the assembly of a handset was exhibited to counteract public resentment against the handset charge. Mr. Hamilton insisted that the Bell System films were circulated to tell the public about the telephone service, use of the telephone, new developments like the transoceanic circuits and the history of the industry. He depicted the films as educational and entertaining and believed that the widespread use of the pictures in theaters, schools and universities and before organizations demonstrated their popularity with the public. The FCC counsel disclosed that the A. T. & T. had spent $262,000 from 1926-35 for the production of films and the associated companies had spent $309,000 for their exhibitions.

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FRONT COVER

The illustration on the front cover is a composite photograph of a section of the Chicago Stadium showing seating arrangements of delegates, alternates and newpapermen and arrangements for radio broadcasting at the Republican and Democratic National conventions in 1932. Communications play a great part in the success of these political conventions. Several innovations, from the communications standpoint, are planned for this year's conventions. Photograph used through the courtesy of the *Bell Telephone News*.

By L. M. BERRY
President, L. M. Berry & Co.

SALESMANSHIP in the Telephone Industry

● I believe that the greatest opportunities in the history of the telephone business are in the years immediately ahead. I firmly believe that nearly everyone is going to be surprised and amazed at the tremendous strides which will be made in business in this country and abroad during the next few years—say during the next five years. Right now is the time for telephone companies to get ready to handle the largest number of telephone subscribers and the largest amount of toll business in their history, and the only question is the exact time that each telephone company will pass its previous all-time peak.

Since it is a recognized sales principle that it is always easier to sell people what they want and need, and since we all know that a very large number of non-subscribers now want and need telephone service, it is obvious that telephone companies should be using every effort right now through their own employes, and through salesmen working on that line alone, to sell more telephones. There has never been a better time than the present, and this is being demonstrated by a large number of telephone companies in all parts of the country.

Every telephone employe should be sales-minded and constantly on the lookout for prospects whose names can be turned over to the commercial department, so that they may be called upon and signed up as subscribers. Where a company's size does not justify a separate sales force, the actual orders for telephones can be taken by the telephone employes.

● There was a time not so long ago when salesmanship could not do much to stem the tide of decreasing telephones and decreasing revenues. It was not because people did not want telephones, but it was because they did not have the money to pay for them; but even during the period of the depression, the proper attitude of telephone employees towards the public in all of their contacts, and the combined efforts to give good service during the most difficult depressions years, represented the best kind of salesmanship for telephone companies in the maintaining of and building up of public relations. . . . .

Now, we all hear a great deal about the difficulties confronting the telephone companies today, and what they may be in the future by reason of increased taxes, new commission orders, the Federal Communications Commission, present administration, new and complicated reports and what not. There are many problems which are new to the industry, but if you will go back in the history of the telephone business for 50 years, you will find there has never been a time when it was without its problems and difficulties and usually when one major trouble has been disposed of, something else has bobbed up to take its place. And I wonder if the history of the telephone business in this respect is not pretty much the history of every other business; in fact, of every individual.

● Therefore, the thing for us to do, and I say us because my association with your companies in selling telephone directory advertising has always made me feel that I am a telephone man and a part of the industry—the

thing for us to do is to meet the DIFFICULTIES on one front, and at the same time, meet the OPPORTUNITIES on another front, never relaxing in our efforts on either front.

Your soldiers are your employes, and every one of them can make either a favorable or an unfavorable impression in every contact with a subscriber, whether it is face-to-face or over the telephone. Everyone of your employes can be a business builder in helping your company to increase both in goodwill and in subscribers. Many telephone companies in all parts of the country have had great success in employes' sales campaigns during the past two years and this plan is being used more than ever today, and is being supplemented by special salesmen who do nothing else but sell telephone service.

Your employes will be more interested in their jobs, regardless of what

Address delivered by L. M. Berry, general manager L. M. Berry & Co., telephone directory advertising specialists, before the New York State Telephone Convention, May 21

departments they are in, if they are sales-minded. They can be made sales-minded if you as a manager will lay out a definite program for them and then see that they follow it.

● In our own field of selling telephone directory advertising we are training our salesmen constantly, and their schooling is a continuous process regardless of the length of time they have been with our company. New conditions demand new ideas, and we are constantly making available to all of our salesmen the new methods and plans which we have found can be used successfully in selling telephone directory advertising.

Therefore, I think it should be a part of a telephone company's routine to keep every employe constantly supplied with all possible information which will help sell new telephone subscribers. You can always hear a lot of reasons why this territory or that territory is different; and nearly every prospect for telephone service, if he does not have it, or has not actually made up his mind to buy it, will have reasons to put off a salesman. But remember, you have something that people want, something they need, something that is a vital necessity in this fast-moving age, and all you have to do through your employes and through your salesmen is to present that something, namely telephone service, in the proper attractive form and words, and orders for telephone service will come, and in such numbers as to surprise you.

Why wait for the business to come to you when you can get it immediately, and much more of it by going after it through your own employes and through salesmen?

● There is a dearth of goods in this country today. According to an article in last Monday's *Wall Street Journal* by C. R. Harrower, the consumption of raw materials and food stuffs throughout the world since the middle of 1932 has outstripped production until now the accumulated surpluses which bore so heavily upon commodity prices in the early years of the depression have been largely eliminated. The article stated further that average world stocks now are at the lowest levels since 1929.

Stocks of wheat, tin and petroleum are below 1929; in the case of petroleum, far below. Stocks of cotton and sugar are just above the corresponding figures for 1929 with every indication that before the end of the year stocks will fall below the 1929 level. This decline in commodity stocks throughout the world takes added sig-

Every Employee a Salesman

nificance in view of the increase in industrial production and business activity which is developing at varying rates. . . . .

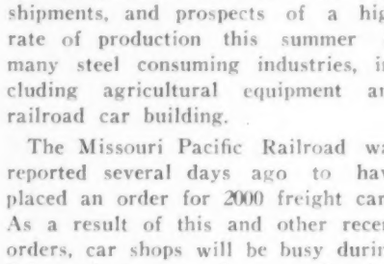
A very great proportion of the import balance which has been shown by this country so far this year is due to the import of raw materials.

● The same issue of this authentic financial publication carried a table showing the electric output of 19 major utility systems during the week ended May 9, all of them indicating increases of from 7.5 per cent to 25.6 per cent over a similar period of 1935.

The heavy industries are getting under way. The magazine *Steel*, in its last issue told of heavier commitments for structural shapes, steel pipes, sheet and tin plate, an increase in pig iron shipments, and prospects of a high rate of production this summer in many steel consuming industries, including agricultural equipment and railroad car building.

The Missouri Pacific Railroad was reported several days ago to have placed an order for 2000 freight cars. As a result of this and other recent orders, car shops will be busy during July and August when usually they are shut down. Orders for 41,000 tons of steel pipe for an oil line between Kansas City and Chicago were placed recently by the Texas Empire Pipe Line Co. These are typical of many large orders recently placed affecting the heavy industries.

The steel business last week was operating at 68½ per cent capacity, while in the Youngstown district the figure was 78 per cent capacity. The April



Make a Sale a Day

new passenger car automobile sales were 350,000 units, which figure had been exceeded only twice before—in 1926 with 338,000 units and in 1930 with 357,000 units. The truck and commercial car sales for the same month were estimated at 55,000 units, which total was exceeded only in one previous month—July 1929.

● Total deposits of the New York City clearing house banks again established a new all-time high record with $10,129,579,000 for the week ended Saturday, May 16. The rapidity of the rise of deposits is seen in the fact that the total stood around five and one-half billion on March 18, 1933, immediately after the national bank holiday. . . . . Deposits in New York City have gained almost two billion dollars in the past year.

In Pittsburgh, contracts for $45,000,000 worth of additions to the present plants have recently been announced by the two largest steel companies.

Don't these figures tend to make you believe that we are on the verge of the greatest buying period in the history of this country? From the beginning of 1930 until last year, most people were buying only what they had to have. For a considerable part of that period there was great discouragement, loss of hope, and a feeling of failure on the part of the country as a whole.

Now, the American people, who are naturally spenders, because they have been taught to appreciate increased enjoyment from modern things, are beginning to replace worn out things with new things. Their confidence and courage has returned. The American people like to live in modern homes with attractive furnishings, electric lights, telephones, radios, electric refrigerators, and all other electric household appliances. They are going to build vast numbers of modern homes during the next few years and they will continue to buy automobiles and to build more and wider good roads. They need clothing, houses need repairs, paint and new furniture; farms need new buildings, new machinery, new fences; factories need new machinery; new locomotives, passenger and freight cars, new rails are needed by railroads; in short, more of everything is needed today by the American people than ever before. The department stores, chain stores and mail order houses are all reporting greatly increased sales over a year ago.

● Airplane travel this year is much greater than last year and last year was almost double that of the year be-

(Please turn to page 24)

Telephone Transmission
Theory and Practice

By ROBERT A. CLARK, JR.

CHAPTER V

In this chapter the principles of transmission losses are discussed together with the theory and methods of measurement

● Almost as soon as the telephone was perfected it was observed that the volume of voice signal in the receiver decreased as the length of connecting line between the transmitter and receiver increased. Experiments also demonstrated that the greater the resistance of the line per mile the greater the transmission loss. When telephone cable came into use it was found that the capacity between the wires of the pair introduced additional losses. The mathematicians soon developed equations for computing the electrical characteristics of open wire and cable and methods for reducing the losses. Notable among these was the invention of the loading coil which was the result of pure mathematical reasoning resulting from a study of the properties of long telephone lines. We will discuss this phenomenon more fully in a subsequent chapter covering open wire and cable circuits.

It soon became evident that some means should be devised to measure the transmission losses on lines and in equipment. As theory had shown that it was possible to construct a combination of resistors and condensers which would be equivalent to any length of open wire or cable, the use of such a network for transmission measurements was proposed. As a unit of measure a mile of 19 ga. paper insulated cable was chosen. The 19 ga. cable at that time had 88-ohm resistance and 0.060 mf capacity per mile. The adjustable network simulating various lengths of line was termed an **artificial cable;** it was constructed so that the loss could be varied in steps (generally one mile) up to about 30 or 40 miles of cable (19 ga. standard).

A circuit similar to that shown in Fig. 30 was used to measure the equivalent loss of a line or piece of equipment. The method consisted of having someone talk into the transmitter while an observer first listened with the unknown loss connected between the transmitter and receiver and then with the artificial cable connected in place of the unknown. The observer attempted to adjust the artificial line until the signals over both paths sounded the same. The unknown loss was then expressed in terms of miles of cable which reduced the signal to the same intensity as over the unknown path. This scheme is still practical especially if an oscillator is used in place of the transmitter so that the signal output remains constant, and a variable attenuation network used in place of the artificial cable.

As the art of telephony progressed it was found that the voice energy was comprised of combinations of frequencies ranging from a few cycles to several thousand cycles. Experiments indicated that for good intelligibility the telephone system should be capable of transmitting all frequencies from about 200 to 2000 cycles with approximately the same degree of attenuation (loss). It was found that single frequency measurements made over the band (200 to 2000 cycles) gave an accurate indication of the way in which a circuit would transmit the voice waves; from thence on single frequency measurements in the above range were used in place of talking tests. With this change in procedure a new complication arose as it was found that the loss introduced by the artificial cable was not constant but increased with the frequency. This necessitated a new method of defining transmission loss, the final outcome of which is the **decibel** standard in the United States and the **decineper** unit in Europe and other foreign countries. These two are similar in theory and differ only in a slight numerical figure.

● The basic principles behind the adoption of the decibel unit are based

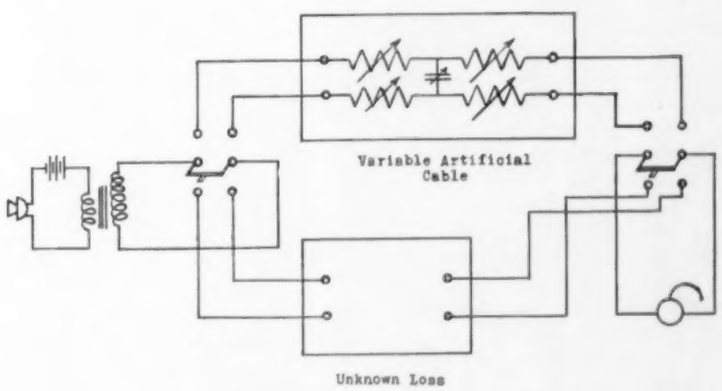


Fig. 30—An early method of measuring transmission loss.

partially on the characteristics of the human ear and partly on a pure mathematical relationship both of which lead to a common conclusion.

Experiments indicated that the ear does not indicate to the brain, sound levels in direct proportion to their power intensity but rather in a logarithmic relation. For example, if a loudspeaker initially delivering 1000 milliwatts of sound energy to a theater audience is reduced to 250 milliwatts, one-fourth of its initial value, the people would think that the speaker unit had been moved six times as far away from them as previously.

If the loud speaker energy is reduced to 10 milliwatts (or 1/100 of its initial value) the speaker would appear to have been removed back 20 times as far away as initially. It turns out that this so-called logarithmic relation holds for many functions involving sound. For example, the sound of a fog horn on the water is illustrative of this relation. Suppose we are a mile away from the horn and hear it without difficulty. We might measure the sound energy and find that it was 1 microwatt (one million microwatts = one watt). As the boat moves to a distance of two miles away from the horn we might find the energy had dropped to one tenth microwatt. The third mile out we would find that the sound energy had dropped to 0.01 microwatt; the fourth mile out we find the sound energy down to 0.001 microwatt. The sound is now down to the point where we begin to have difficulty hearing it. In other words if we can hear a sound comfortably its intensity can be reduced to 0.001 or 0.1 per cent of its initial value before it reaches inaudibility.

● Returning to the telephone case we find that the same principles hold with respect to length of connecting line between the transmitter and receiver. Suppose we have a transmitter which when spoken into will deliver 10 milliwatts of energy. If a telephone receiver were connected directly to such an output the voice signal would be uncomfortably loud. Now if we connected 50 miles of open wire telephone line (No. 12 AWG 47 per cent copperweld for example) between the transmitter and receiver we would find that the energy at the receiver was only 1 milliwatt. Adding another 50 miles of line (100 miles total) would reduce the energy to 0.1 milliwatt; another 50 miles (150 miles total) would bring the energy down to 0.01 milliwatt. The signal now begins to get rather faint although understandable. With the addition of 50 miles more (200 miles total) the signal energy of 0.001 milliwatt is so weak that it is barely understandable.

You will note that with each addition of 50 miles of line the signal energy is reduced to 10 per cent of its previous value. The first 50 miles reduces the energy from 10 milliwatts to (10 per cent of 10 milliwatts) 1 milliwatt. The second 50 miles reduces the 1 milliwatt to 0.1 milliwatt and so on. The fact that each additional section of line reduces the energy in a fractional amount enables us to use the logarithmic functions to simplify the transmission calculations. It is not essential that you understand the principles of logarithmics in order to calculate transmission losses; however, I would suggest that you briefly review the logarithmic theory which may be found in most any mathematical text.[1]

The ratio of received power (in watts or milliwatts) to the transmitted power expressed in the logarithmic function, forms the basis of telephone transmission measurements. The unit of measurement (as before mentioned) is the decibel. The basic formula is

$$\text{db} = 10 \log_{10} \left(\frac{P_t}{P_r} \right) \qquad (24)$$

Where P_t is the power output from the source and P_r is the power received at the receiving device, both expressed in the same units, generally milliwatts.

Referring back to the example of line loss if we have an output from the transmitter of 10 milliwatts and the power delivered to the receiver is 1 milliwatt the ratio of P_t / P_r is 10 and from our table of logarithms and formula (24) we find that the transmission equivalent is 10 db.

We observed that with each addition of a 50-mile section of line the power was reduced in the proportion of 10 to 1. Therefore each section must have

TABLE 7. RELATION OF DB TO POWER AND VOLTAGE RATIO

Db	V_t/V_r	V_r/V_t	P_t/P_r	P_r/P_t	Db	V_t/V_r	V_r/V_t	P_t/P_r	P_r/P_t
0.1	1.012	.989	1.023	.977	15.0	5.62	.178	31.6	.0316
0.2	1.023	.977	1.047	.955	15.5	5.96	.168	35.5	.0282
0.3	1.035	.966	1.072	.933	16.0	6.31	.158	39.8	.0251
0.4	1.047	.955	1.096	.912	16.5	6.68	.150	44.7	.0224
0.5	1.059	.944	1.122	.891	17.0	7.08	.141	50.1	.0200
0.6	1.072	.933	1.148	.871	17.5	7.50	.133	56.2	.0178
0.7	1.084	.923	1.175	.851	18.0	7.94	.126	63.1	.0158
0.8	1.096	.912	1.202	.832	18.5	8.41	.119	70.8	.0141
0.9	1.109	.902	1.230	.813	19.0	8.91	.112	79.4	.0126
1.0	1.122	.891	1.259	.794	19.5	9.44	.106	89.1	.0112
1.1	1.135	.881	1.288	.776	20.0	10.00	.1000	100.	.0100
1.2	1.148	.871	1.318	.759	20.5	10.59	.0944	112.	.00891
1.3	1.162	.861	1.349	.741	21.0	11.22	.0891	126.	.00794
1.4	1.175	.851	1.380	.724	21.5	11.88	.0841	141.	.00708
1.5	1.188	.841	1.413	.708	22.0	12.59	.0794	158.	.00631
1.6	1.202	.832	1.445	.692	22.5	13.34	.0750	178.	.00562
1.7	1.216	.822	1.479	.676	23.0	14.13	.0708	200.	.00501
1.8	1.230	.813	1.514	.661	23.5	14.96	.0668	224.	.00447
1.9	1.245	.804	1.549	.645	24.0	15.85	.0631	251.	.00398
2.0	1.259	.794	1.585	.631	24.5	16.79	.0596	282.	.00355
2.5	1.334	.750	1.778	.562	25.0	17.78	.0562	316.	.00316
3.0	1.413	.708	1.995	.501	25.5	18.84	.0531	355.	.00282
3.5	1.496	.668	2.24	.447	26.0	19.95	.0501	398.	.00251
4.0	1.585	.631	2.51	.398	26.5	21.1	.0473	447	.00224
4.5	1.679	.596	2.82	.355	27.0	22.4	.0447	501.	.00200
5.0	1.778	.562	3.16	.316	27.5	23.7	.0422	562.	.00178
5.5	1.884	.531	3.55	.282	28.0	25.1	.0398	631.	.00158
6.0	1.995	.501	3.98	.251	28.5	26.6	.0376	708.	.00141
6.5	2.11	.473	4.47	.224	29.0	28.2	.0355	794.	.00126
7.0	2.24	.447	5.01	.200	29.5	29.8	.0335	891.	.00112
7.5	2.37	.422	5.62	.178	30.0	31.6	.0316	1,000.	.00100
8.0	2.51	.398	6.31	.158	31.0	35.5	.0282	1,260.	$7.94 \cdot 10^{-4}$
8.5	2.66	.376	7.08	.141	32.0	39.8	.0251	1,580.	$6.31 \cdot 10^{-4}$
9.0	2.82	.355	7.94	.126	33.0	44.7	.0224	2,000.	$5.01 \cdot 10^{-4}$
9.5	2.98	.335	8.91	.112	34.0	50.1	.0200	2,510.	$3.98 \cdot 10^{-4}$
10.0	3.16	.316	10.00	.100	35.0	56.2	.0178	3,160.	$3.16 \cdot 10^{-4}$
10.5	3.35	.298	11.2	.0891	35.0	63.1	.0158	3,980.	$2.51 \cdot 10^{-4}$
11.0	3.55	.282	12.6	.0794	37.0	70.8	.0141	5,010.	$2.00 \cdot 10^{-4}$
11.5	3.76	.266	14.1	.0708	38.0	79.4	.0126	6,310.	$1.58 \cdot 10^{-4}$
12.0	3.98	.251	15.8	.0631	39.0	89.1	.0112	7,940.	$1.26 \cdot 10^{-4}$
12.5	4.22	.237	17.8	.0562	40.0	100.0	.0100	$1.00 \cdot 10^{4}$	$1.00 \cdot 10^{-4}$
13.0	4.47	.224	20.0	.0501	50.0	316.0	.00316	$1.00 \cdot 10^{5}$	$1.00 \cdot 10^{-5}$
13.5	4.73	.211	22.4	.0447	60.0	1,000.0	.00100	$1.00 \cdot 10^{6}$	$1.00 \cdot 10^{-6}$
14.0	5.01	.200	25.1	.0398	70.0	3,160.0	.00032	$1.00 \cdot 10^{7}$	$1.00 \cdot 10^{-7}$
14.5	5.31	.188	28.2	.0355	80.0	10,000.0	.00010	$1.00 \cdot 10^{8}$	$1.00 \cdot 10^{-8}$

10 db loss. Now if we apply equation (24) to the case of 100 miles of line, we find that the ratio of power delivered by the transmitter to that received at the receiver is 100 to 1 or 20 db. This demonstrates the important principle that if on a long circuit, we have a number of sources of transmission loss such as open wire, cable, repeating coils, etc. each of which is known in db we can obtain the total circuit loss by adding together the individual equivalents. For example, in the above case where we had four 50-mile sections of line each of which had 10 db loss the total loss would be 40 db. As a check of this figure, we had 10 milliwatts output from the transmitter and received 0.001 milliwatt at the end of the 200 mile line. The power ratio is 10/0.001 or 10,000. Applying formula (24) we find that the db equivalent is 40 db; this checks the sum of the four sections we found by addition of the individual sections to be 40 db.

As discussed briefly in Chapter IV most telephone equipment is designed to have a nominal impedance of 600 ohms. We know that the power developed in a resistance varies as the square of the voltage (equation 5). This relation permits the use of voltage ratios in expressing db equivalents where the impedances at the receiving end are the same as at the transmitter. Expressed in terms of voltage ratios the formula for transmission equivalent is

$$\mathbf{db} = 20 \log_{10}\left(\frac{\mathbf{V_t}}{\mathbf{V_r}}\right) \qquad (25)$$

Where $\mathbf{V_t}$ is the voltage across a given size resistance (say 600 ohms) when connected directly to the source of voltage and $\mathbf{V_r}$ is the voltage across the same size resistor when the loss (line or equipment) is interposed between the two. Table 7, on page 16, shows the relation of db equivalents to power and voltage ratios for losses up to 80 db.

For rough approximations the scale shown in Fig. 31 may be used to convert from db to voltage or power ratios and vice versa.

● It is readily possible to interpolate between the values shown; for example, to find the power ratio $\mathbf{P_t}/\mathbf{P_r}$ for an equivalent of 10.8 db, multiply the power ratios for any two transmission equivalents the sum of which equals the total figure of 10.8, this gives the equivalent of the total. Two equivalents which total 10.8 are 10.0 and 0.8, the power ratios for these two are 10.0 and 1.202 respectively; their product is 12.02 which is the power ratio for an equivalent of 10.8 db. Another example: find the voltage ratio $\mathbf{V_r}/\mathbf{V_t}$ for an equivalent of 47 db. The voltage ratio $\mathbf{V_r}/\mathbf{V_t}$ for 40 db is 0.01 and for 7 db is 0.447, therefore the voltage ratio is 0.01 x 0.447 = 0.00447.

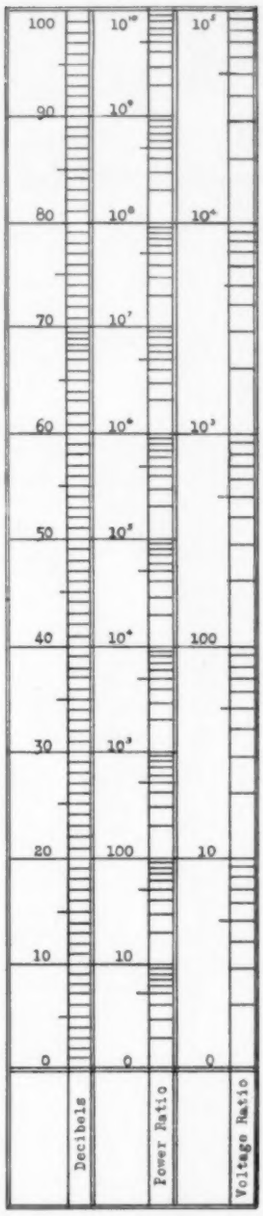


Fig. 31—Scale showing relation of decibels to power and voltage ratios.

For several years prior to the adoption of the decibel as a standard of transmission the "mile of standard cable" at 800 cycles was used to express transmission loss. You may wish to use the relation between the decibel and the mile cable which is

1 db = 1.055 miles

1 mile = 0.947 db.

Prior to the adoption of the name, decibel, the term transmission unit (abbreviated TU) was used in technical literature; these two terms express the same relation and are therefore numerically equal. In Europe the decineper was adopted as the unit of transmission. It evolved from the basic equations of losses expressed in terms of fundamental line constants (resistance, inductance and capacity). The relation between db and decinepers is:

1 db = 1.151 decinepers

1 decineper = 0.8686 db.

The attenuation constant (sometimes termed Alpha and sometimes Beta) often found in texts is equal to 10 decinepers or 8.686 db.

Bibliography

1. Algebra for the Practical Man, by J. E. Thompson. Order through TELEPHONE ENGINEER.

Symbols & Abbreviations

db Decibels.

miles Miles of standard cable at 800 cycles.

$\mathbf{P_t}$ Power output of source.

$\mathbf{P_r}$ Power input to receiving device.

$\mathbf{V_t}$ Voltage across source when connected to receiving device of same impedance.

$\mathbf{V_r}$ Voltage across receiving device having same impedance as source.

TO BE CONTINUED

MAKING BIG HIT

Mr. Clark's articles on "Telephone Transmission — Theory and Practice" have created unusual favorable comment among telephone engineers everywhere and many have acclaimed them the best ever written on this subject.

While Mr. Clark's articles began in the February issue, subscriptions are still coming in to begin with that month in order to have the complete series on hand at all times.

We consider ourselves very fortunate in being able to present articles of such high calibre and we are in a position to supply back copies containing these articles to anyone desiring to subscribe at this late date.

If you want all of Mr. Clark's articles, send in your subscription to begin with February TODAY as copies of past issues are going fast. Send your subscription direct to TELEPHONE ENGINEER at the new low rate of one year for $1.00 or two years for only $2.00.

A. T. & T. and Western Win Anti-Trust Suit

Federal Judge John C. Knox has handed down a decision in the United States District Court for the Southern District of New York granting the motion of the American Telephone and Telegraph Co., the Western Electric Co., the Electrical Research Products Inc. to dismiss the complaint of Bernard Gogel, who, as assignee of the Standard Sound Recording Corp., brought suit against these three companies for $3,000,000 damages for their alleged violation of the Sherman and Clayton Anti-Trust Acts.

LINE and DESK

RAY BLAIN, Member A. I. E. E., Editor

Q. Is a rubber eraser satisfactory for polishing switchboard plugs?

A. The eraser works fairly satisfactory on small switchboards though we prefer the regular polishing paste which can be purchased reasonably.

Q. What type of paint is recommended for use on cast iron telephones installed outdoors?

A. A good grade of aluminum paint will be found entirely satisfactory for this purpose.

Q. What size cable clamp should be used to fasten a 25-pair cable along the side of a building?

A. This will depend to a great extent on the type and kind of lead cable used. Ordinarily a 5/8" clamp will be required.

Q. How can drop wire fixtures be removed from stucco walls without damaging them?

A. This is a most difficult task and ordinarily such attachments should not be removed unless so requested by the owner. When fixtures must be removed and stucco walls are damaged they should be immediately repaired by a qualified workman.

Q. How can the finish of the cabinet of a new switchboard be best preserved?

A. All standard furniture polishes are good and will be found entirely satisfactory for this purpose if properly used. Many prefer to use only a good grade of wax and keep it well rubbed down.

Q. How should aerial cable be lashed to messenger to prevent it creeping on hills?

A. We would not recommend lashing as harm might be caused to the cable sheath. Grade clamps can be purchased at a reasonable cost, are easy to install and accomplish their purpose without possible damage to the cable.

Q. Do one-way trunks prove an advantage over two-way on a PBX?

A. From a service point of view the one-way trunk may be likened to the double-track system in railroading. The one-way trunk eliminates much confusion and gives a more rapid service. The outgoing and incoming traffic from a PBX is seldom, if ever, equal and an adequate number of one-way trunks can be provided in each group. The two-way trunks may prove-in from a cost standpoint.

Q. What is a rotary pole changer and how can it be used to supply ringing current for a telephone system?

A. This type of ringing machine was at one time commonly used on telephone systems in the United States. It consisted of a small motor which turned a commutator which interrupted the exchange battery at the proper frequency. The output of the machine was then stepped up through a transformer to the required voltage before being delivered to the switchboard.

O. How many circuits between instruments are required on a 12-station intercommunication system?

A. On a 12-station system of the push button variety when full metallic rather than a common return system is used, a total of 14 circuits will be required, one for each telephone and a common circuit each for the talking and ringing battery. If the system is at all scattered a small automatic PBX system will probably prove more economical.

Q. Is it considered desirable to encourage the installation of conduits for telephone wiring when new dwelling houses are being constructed?

A. This practice is on the increase and we are of the opinion that money spent for this conduit is a good investment. It always seems a shame to tack wiring to baseboards and start drilling holes in a new house. When conduit for telephone wiring is placed in a new house care should be taken to provide outlets at the most desirable locations and where telephones may possibly be desired. Installing a telephone where conduit is not provided may cause all benefit of the conduit system to be lost.

Q. Is there any objection to fanning out small paper insulated cables on house terminals?

A. This is not ordinarily considered an approved practice as the paper insulated cable should be first spliced to lead covered, silk and cotton insulated cable and this formed on the house terminal. However, many do form the paper cable on inside terminals when installed in dry locations, with complete success. The paper cable should be boiled out in beeswax and butted in such a manner that moisture will be prevented from creeping under the sheath from the terminal.

Q. Is it true that dial faces which have both letters and numerals cause confusion of the user when dialing numbers?

A. This is a disputed fact with one group claiming that the letters and numbers cause confusion while the other group claim it does not cause any trouble though that dialing a long number without a letter prefix does. Some also claim that the "0" on the tenth digit and the letter "O" on the sixth digit cause confusion. Thousands of both type dials are in daily use and it is impossible for us to state which is the most desirable from all viewpoints as only time will tell.

Q. We are experiencing considerable difficulty in getting a loud clear ring from the bells on our telephones and wonder if you may be able to suggest a possible remedy.

A. One of many different defects could be causing your trouble. The first thing we suggest is that you make sure that the ringing current is up to par. Next make sure that the armature does not bind but moves freely without excessive side play. Check armature air gap and make sure that they are correct. See that the biasing spring is not too tight. The gong adjustment should also be carefully checked. The ball on the clapper should clear the gongs slightly when the armature has reached its extreme position. This careful gong adjustment is quite necessary and should never be slighted.

Q. We have numerous requests from our subscribers for extra long cords on desk stands but we have not found their installation a profitable investment. Is there any successful substitute for the long cord?

A. Most operating companies do not desire to refuse any type of service to their subscribers though many will not install the extra long cord on desk

(Please turn to page 24)

ON, CENTRAL OFFICE AND OUTSIDE PLANT..

"Tapping In" On Washington

(Continued from page 12)

Accounting Case Review . . .

On the final day of its term, June 2, the Supreme Court announced that it would grant the appeal of the American Telephone and Telegraph Co. and Bell System and seven companies of the General Telephone Corp. on the FCC Telephone Uniform Accounting System. The arguments and decision on the appeal are expected to be held in the early part of the next Supreme Court term, which begins in October. Briefs by the telephone companies and FCC and Department of Justice will be filed in October. The appeal is from a decision of the three-judge statutory court in New York and hinges on the original cost and depreciation features of the FCC system.

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Payne Reappointed . . .

Commissioner George Henry Payne, telegraph division vice chairman and New York progressive Republican, has been named by President Roosevelt for a seven-year term on the FCC. Commissioner Payne's term which had been for two years from the 1934 creation of the Commission would have expired July 1. One of the accomplishments of Commissioner Payne's previous service was the securing of a direct radio-telephone circuit between New York and Paris to break down the monopoly of Great Britain over transoceanic telephony.

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Independents Under FCC . . .

As a result of hearings last Winter, Chief Examiner Arnold of the Commission recommended that the Cass County Telephone Co. in Missouri and the Champaign Telephone Co., Urbana, Ohio should be made subject to the Commission's jurisdiction because of the large financial interest of Bell System companies in these carriers. The Southwestern Bell and the Ohio Bell, it was disclosed, had a stock interest of around 50 per cent in the respective companies. It is believed likely that the Champaign company will appeal the examiner's finding to the telephone division commissioners. These were the first two ruling on Independent companies in which the Bell System has a financial interest and both of these Independents conducted purely intra-state telephone operations on their own facilities. The Commission, however, exempted from jurisdiction another Independent, the Peoples' Mutual Co. of Davis, Ill., with part ownership of a toll line into Wisconsin.

Postpone Toll Case . . .

The FCC has changed the controversy of long standing of the Oklahoma-Arkansas Telephone Co. against the Southwestern Bell Telephone Co. on toll service connections and division of revenues to be held at Fort Smith, Ark., next October 5. Previously the hearing in the case had been scheduled for July 6 in Washington, D. C.

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A. T. & T. Charged With "Propaganda" Gifts

The Federal Communications Commission on June 9 charged that the Bell Telephone System had contributed money toward civic and charitable organizations for purposes of propaganda, according to press reports.

The FCC claimed that in permitting employes to join chambers of commerce and other groups the Bell system was bent on propagating its point of view, particularly with respect to rate cases and legislative problems.

The FCC singled out the 1929 report of the Illinois Bell Telephone company to bear out its contention. Illinois Bell made contributions to the following:

Country Club of Peoria, Illini Country club, Springfield; Joliet Chamber of Commerce, Knollwood club, Chicago; Mutual Information bureau, Chicago; Oak Park club, and South Shore Country club, Chicago. The 1930 report showed contributions to the Chicago Athletic association and Chicago Golf club of Wheaton.

"These contributions, in some cases amounting to as much as $2,500 are designed as stock investments, notes or membership certificates," said the report in connection with the Illinois clubs. "Thus, besides membership dues and direct contributions, Bell companies render financial assistance to various clubs and associations and promotional organizations through indirect investments in notes, bonds, stock or membership certificates.

"These investments are often written down from their original cost and many are ultimately placed on the books at $1, a recognition of the fact that they are not income producing assets. Such contributions were generally omitted by the Bell companies from the responses to the FCC letter of Nov. 27, 1935."

Refuse to Comment

Officials of the Illinois Bell Telephone Co. declined to comment on testimony presented June 9 at the Federal Communications Commission hearing.

According to press reports it was explained A. T. & T. thus far has not been permitted to cross-examine witnesses or present its side of the case at the hearings, and that all comment is being withheld until formal testimony can be offered.

Western Electric Votes Dividend After 5 Years

Directors of the Western Electric Co. on June 9 declared a dividend of 50 cents on the common stock, thereby resuming payments after a lapse of five years. Since more than 99 per cent of Western Electric's common stock is owned by American Telephone and Telegraph Co., the latter organization will receive almost all of the $3,000,000 disbursement, which is to be made July 30 to stock of record June 25.

The last dividend paid by Western Electric was 75 cents, disbursed June 30, 1931. In 1931 it paid $1.75, and in 1930 and 1929 it paid $4, with a $1 extra in 1929.

Net income of the company last year was $2,620,279, as compared with deficits for 1934, 1933, and 1932, respectively, of $7,751,548, $13,772,504, and $12,625,972. The company had its largest net income, $26,995,246, in 1929, the peak year for industrial activity.

Payment of the dividend is a reflection of Western Electric's activities. At the company's Hawthorne works at Cicero, Ill., its largest manufacturing plant, there has been a gradual but steady increase in employment. As of June 1 there were 10,520 persons employed at the Hawthorne plant, an increase of 2,000 since Jan. 1, 1936, and of 700 since May 1.

The disastrous floods of early this year greatly reduced the inventories of telephones and parts, and it is indicated that employment will be maintained at a fairly high level for the rest of the year to supply the deficiency.

Western Electric is also manufacturing some other electrical equipment at its Chicago plant, including apparatus used for sound movies. One of the more interesting devices it has been working on recently is a "watch rate recorder." This device, which makes use of the photo-electric cell, is employed by watch manufacturing companies to check on the speed of watches as they come off the manufacturing line. Whether a watch is fast or slow can be determined in thirty seconds by the use of this device.

Buys New Building

The Polk City (Ia) Telephone Co. just recently purchased the H. Nagle property and will move in the near future to their new quarters. The move will be made in an effort to secure better office facilities, the larger quarters improving service and conditions.

Editorial « « «

A Call for Action

● By the time this editorial is in print the Republican national convention will be a thing of the past and the candidates for the presidency and vice presidency for this party will have been chosen. In a few more days the Democrats will meet and pick their standard-bearers.

And — soon these candidates and state and local politicians, who were chosen in the primary elections, will be broadcasting their ballyhoo about this and that party, their platforms and the men and women selected to uphold them.

Without entering into any discussion about the merits of the above parties, their platforms, their candidates or the political situation today, we believe the comments made by Frank L. McKinney, secretary of the Ohio Telephone Association, at its recent convention should be the guide for all Bell and Independent telephone *executives, employees and stockholders* in their activity for the next four or five months.

● Mr. McKinney, in what he termed "the most serious suggestion that I have ever offered to the members of this association", said:

" . . . May I respectfully suggest that every Independent telephone man and woman, whether an employee or a stockholder, or both, make it a point to take an active part in politics during the remainder of the year. You know better than I can tell you, who the candidates are who will help business and labor to uphold the traditional American way of doing things in your community, state and nation. These are the men who must be elected to the legislature, to Congress, and to the Chief Executiveship, if the American system is to survive and continue. Your personal efforts, and your financial help must be extended to assist wise and understanding persons to win local, state and national offices. . . . I hope that all of you will take advantage of the opportunity that still remains to you to offer real opposition to the isms and idiocies that are being offered as a universal panacea for the woes of humanity."

Salesmanship In The Telephone Industry

(Continued from page 14)

fore. It is going to continue to increase at a very rapid rate, as people get more confidence in its safety. Machinery has all but abolished the hard manual toil which was a part of life a generation ago. There are still more home owners in the United States than in any other country in the world. More children in this country are sent to high schools and colleges than in any other country in the world.

Friends, a desire to buy your telephone service has already been created in the minds of many who do not have it, and remember there are several million children growing into manhood and womanhood every year and they are new prospects.

We have told all of our salesmen that the time to sell more telephone directory advertising is right now, today, and by selling our customers what they should have today, we will satisfy them and also sell many of them more advertising next year. So the same thing goes in the telephone business itself—the time to sell more telephones is right now—today.

It is not a difficult task to get your employes sales-minded so that they can at least find prospects for salesmen to call upon. Many people have the idea that they can never sell anything. There is not a telephone emploe who cannot talk to his or her friends and others about the value of telephone service. I do not mean that everybody can sell goods, or commodities, or service. I do mean that anyone with ordinary intelligence, with a real interest in what he is doing, can sell his ideas or himself to others. Very often merely a suggestion on the part of a telephone employe to some acquaintance that telephone service would be useful, is enough to result in an order. There are prospects for telephone service on every side of us, in every town, if we will just look around, with our eyes and ears open, and then do a little talking.

● To excel in any line of activity a man or woman must have knowledge; and today in salesmanship it takes knowledge—knowledge of the product, knowledge of self, and above all, knowledge of the all-important being, the customer. Generally speaking, there is just one thing which prevents a poor salesman from becoming a good one—laziness. If he is too lazy to study his product, his customers and himself, then he will suffer from lack of knowledge, and lack of knowledge induces fear. Today a great many salesmen are whipped before they make the first call. The thought of failure has already gripped them. Sincerity is certainly one of the most important qualities, if not the most important, for the salesman. It is just impossible to stop a man, whatever his handicaps, if he knows and believes in his product and himself.

Every telephone employe should be thoroughly sold on the fact that the telephone rates are right and that the subscribers are getting their money's worth.

In conclusion, I do not wish to minimize the importance of the difficulties confronting the telephone industry today. On the other hand, let us take advantage of the great opportunities which are here right now and which are going to continue during the next few years.

We can do this by having all of our employes and associates on their toes, so that each telephone company's organization will be sales-minded in every respect, including building up public relations as well as building up telephone subscribers and revenues. If you are not already doing it, it will pay to start thinking today of all the reasons why more people in your community should have telephone service, and then your people can go out and sell them. . . . .

Commonwealth Improves Richland Center Exchange

The Commonwealth Telephone Co. completed last month a modernization program on its lines in Richland Center, Wis., that began early in November last year. As a result of this seven month program, every telephone in the city is now served by a metallic circuit, and every line entering the telephone exchange is through a cable line. Certain to result in a much improved service to the city, the program brings to realization a development that company officials have long contemplated. Four years ago the company installed cable circuits all over the south portion of the city, and there has been a reduction in the number of service calls from that section. The installation of the cable circuits resulted in a reduction in the number of lines necessary and it has been possible to remove completely some of the lines of poles that have traversed several areas.

More than one-third of Bell Telephone System employees own stock in the American Telephone and Telegraph Company.

Line and Desk: Questions & Answers

(Continued from page 18)

stands. An extension set will often eliminate the necessity of the special cord. When cost prohibits the installation of a sufficient number of extension sets to provide service at all desired points often a system of jacks will solve the problem. A plug is installed on the desk stand cord and it can be used at either jack on the system.

Q. We have a main frame on which is terminated three 200-pair cables and the question arises as to how these cables should be numbered and designated on the protectors? Any plan you can suggest will be appreciated.

A. The customary method is to designate them as cables, 1, 2 and 3 and number the pairs from 1 to 201 in each cable. This method generally causes some confusion due to pair numbers being the same in each cable and as an example a jumper may be connected to pair 41 in cable No. 2 when pair 41 in cable No. 3 is desired. Personally we prefer the method of losing the identity of the separate cables and numbering the pairs consecutively on the rack from left to right from 1 to 603 or whatever count is being used. We have found this method entirely satisfactory and never causes confusion.

Telephones and Our Present Day Life

Fifty years ago when the telephone was young business was conducted largely on an intimate face to face basis. A half century has brought about revolutionary changes which tend to make contact between individuals less intimate and more hurried. In meeting these present day conditions, the telephone is used by practically all the people to save time and maintain contact with the business and social world.

The old saying, that "It's a small world after all," has been made a fact by the telephone. It has annihilated the disadvantages of distance and time, in bringing officers and people thousands of miles apart, together in intimate conversation. Our modern, high-speed business and life is absolutely dependent on it. No other invention has done more to make this age of miracles possible. It is certain that historians of the future, in detailing the past fifty years, will give the telephone much of the credit for the great progress made during that time. — **Depere (Wis.) Journal Democrat.**

South Dakota Group Holds Convention

The annual convention of the South Dakota Telephone Association was held on May 14 in Mitchell.

F. E. Wheeler, of Scotland, president, Peoples Telephone Co., was re-elected president for the ensuing year; Ira S. Burnett, Armour, and W. W. Straight, Crooks, were elected vice-presidents; and Thomas Palen, Aberdeen, was re-elected secretary-treasurer.

Mr. Straight, Mr. Burnett and Mr. Wheeler were all re-elected to the board of directors. Gust Quast, Menno, was appointed to the board of directors to fill the unexpired term of P. F. Orcutt, Custer, who has moved out of the state.

The following speakers were on the program: Mayor George Fredericks of Mitchell; President Wheeler; A. A. Little, transmission supervisor, Dakota Central Telephone Co., Aberdeen; J. C. Crowley, Jr., St. Paul, Minn., secretary, Minnesota Telephone Association; Charles E. Adams, general manager, Groton-Ferney Telephone Co.; R. W. Aszmus, manager, Stickney Telephone Exchange; W. R. Johnson, general commercial manager, Northwestern Bell Telephone Co.; Carl Ralston, secretary, Mitchell Chamber of Commerce; C. R. Hicks, manager, Dakota Central Telephone Co., Mitchell; and Stanley Brekhus, accountant, South Dakota Board of Railroad Commissioners.

New York Convention Draws Big Crowd

The 14th annual convention of the New York State Telephone Association was held May 20 and 21 in Syracuse with the largest attendance since 1932, 85 per cent of the membership being represented, according to Vice-President and General Manager J. G. Ihmsen.

The following directors were re-elected: J. P. Boylan, president; Rochester Telephone Corp.; F. D. Fancher, vice-president, Orange County Telephone Co.; H. H. Griswold, president, Ontario Telephone Co., Inc.; J. G. Ihmsen, vice-president and general manager of the Association.

A. R. Maytum, general manager, Dunkirk & Fredonia Telephone Co.; L. H. Meyer, general manager, Upstate Telephone Corp.; C. B. Sayer, general manager, Chatham Telephone Corp.; W. A. Seely, general manager, Chenango & Unadilla Telephone Co.; and John Troy, general manager, Red Hook Telephone Co.

The officers re-elected were as follows: President, Mr. Boylan; vice-president and general manager, Mr. Ihmsen; secretary, Mr. Griswold; and treasurer, Chas. M. Beattie, Rochester. S. G. Bowie, of Rochester, was elected assistant secretary and assistant treasurer.

Among the speakers at the convention were F. B. MacKinnon, president United States Independent Telephone Association; Merwin K. Hart, president, New York State Economic Council; Spencer D. Parratt, professor, Syracuse University; B. Edward Shlesinger, Rochester attorney; L. M. Berry, president, L. M. Berry & Co.; Carl Whitmore, general plant manager, New York Telephone Co.; Henry S. Fraser, Syracuse attorney; Stephen P. Toadvine, manager, Syracuse Better Business Bureau; LeRoy Allen Mullin, assistant professor, Syracuse University and Emmett D. Talbot, partner, John C. Larkin & Co., consultant engineers.

U. S. Has More Than 50% of World's Telephones

Since the beginning of the 20th century, the population of the world has increased by approximately 33 per cent. During this period telephone service, which was less than a quarter of a century old in 1900, has increased over 2,100 per cent in extent. A survey of the world's telephones just completed by the American Telephone and Telegraph Co. shows that there were 33,539,890 telephones in the world on Jan. 1, 1935, the latest date for which comparable statistics are available. Thirty-five years ago telephone communication was restricted to comparably short distances. Today it is possible to talk around the world. Telephone subscribers in the United States can be connected with any one of more than 17,000,000 telephones in this country and any one of some 15,000,000 telephones in foreign lands; in all, the American subscriber has access to 93 per cent of the world's telephones.

The survey shows that 16,868,955, or more than one-half of the world's telephones, were located in the United States on Jan. 1, 1935. Europe at that date had 12,028,756 telephones, or approximately 35 per cent of the world total. Canada and Japan each had over 3 per cent of the world total with 1,193,729 and 1,068,244 telephones, respectively. The remaining 7 per cent of the world's telephones were distributed over Asia, Africa, Oceania, and South and Central America.

More than 61 per cent of the world's telephones are operated by privately owned systems. In the United States, all telephones are operated by private companies and this country not only has more telephones than all the rest of the world, but also excels in the number of telephones relative to population. In fact, the United States, with 13.36 telephones for each 100 of its people, has more than six times the corresponding telephone development of Europe. The second ranking country in telephone density is Canada, with 11.00 telephones per 100 population, where 84 per cent of the telephones are under private operation. Next, comes Denmark with a development of 10.31 and with 96 per cent of its telephones privately operated.

The largest number of telephones to be found in any country outside of the United States is 3,134,103 in Germany, all of which are owned and operated by the German government. However, the German system provides only 4.69 telephones per 100 population, or slightly more than one-third the development in the United States. Great Britain and France, also with government systems, have 4.06 and 3.30 telephones per 100 people, respectively.

A. T. & T. Reduces Rates on Foreign Calls

The American Telephone and Telegraph Co. has filed with the Federal Communications Commission reduced rates effective July 1 from all places in the United States to foreign countries.

Under the new schedule three-minute calls from eastern seaboard cities to Paris and London will be reduced from $30 to $21 in the day time and the Sunday and night charge will be $15.

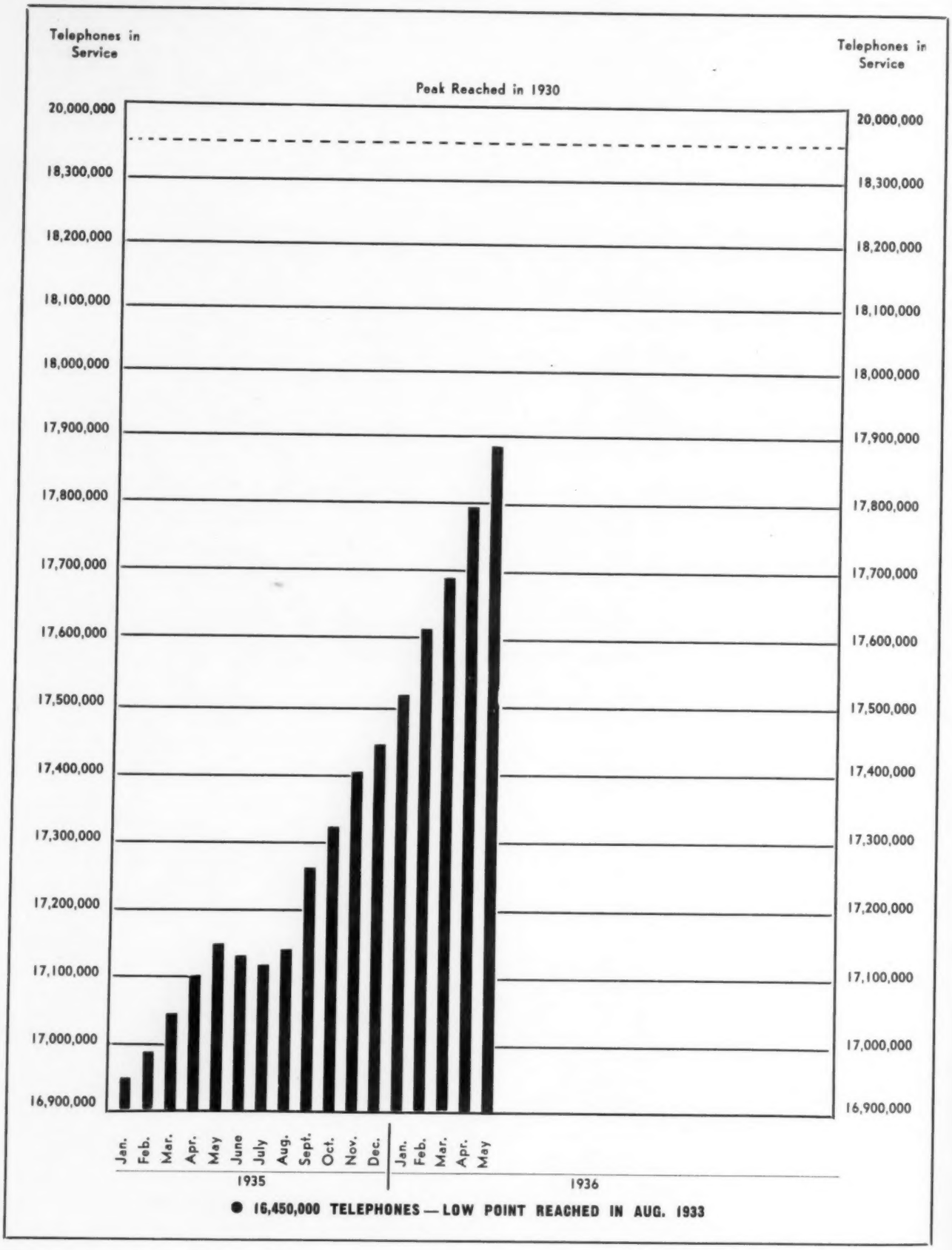
Reductions will apply to 45 of the 67 countries which may be reached from the telephones in this country.

The new schedule will reduce charges on three-minute calls to Europe $9 on week days and $6 at night and $15 on Sundays. Charges to most South American and Central American countries will be scaled $9 on week days $15 on Sundays. Charges to Puerto Rico and Cuba also will be cut.

When the American Telephone Company inaugurated the service to Europe in 1927 a three-minute conversation between New York and London cost $75.

The first successful demonstration of Bell System radio telephony took place in 1915, when speech was transmitted from Mohawk Point, Long Island, to Wilmington, Del., a distance of 250 miles.

Monthly Telephone Station Barometer



Griffith Named Manager of Fort Dodge Company

Thomas J. Griffith, superintendent, Fort Dodge Telephone Co., has been appointed general manager of the company to succeed Joseph M. Plaister, who died a few weeks ago.

The appointment was made at a recent meeting of the board of directors. At the same time, Miss Margaret Froh, who has been assistant secretary, manager of the commercial department and secretary to Mr. Plaister, was named treasurer of the company.

Mr. Griffith, who was also elected a member of the board of directors, has been with the company since 1908. His first job was with the construction crew. He won promotion steadily and in 1917 was named wire chief. Two years later he became superintendent and has held that position since. He was closely associated with Mr. Plaister for many years and took an active part in the improvement program that gave the Fort Dodge Telephone Co. one of the finest plants in the United States.

Miss Froh observed her 18th anniversary with the telephone company on May 20. She will continue her duties as assistant secretary and head of the commercial department in addition to handling the treasurer's work.

O. M. Oleson is president of the company, Denis M. Kelleher, vice-president and Walter L. Casteel, secretary.

Southwestern Bell Drops Handset Charge

The Southwestern Bell Telephone Co. has filed a new schedule with the Missouri Public Service Commission, eliminating an extra charge of 15 cents a month for handsets, which have been in use two years or more.

Removal of the charge applies to all such instruments used by customers of the company in Missouri for 24 months or more. The changes became effective with billing periods beginning in June. The 15-cent monthly charge will continue in effect for such instruments in use less than two years, until the 24-month period is completed.

Christianson Appointed By Associated

H. R. Christianson, formerly manager of the Iowa State Telephone Co. resigned his position at Newton, Ia., last month to become general manager of the Associated Telephone Co. at Muskegon, Mich. At Muskegon he will have charge of 69 exchanges.

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RINGING CONVERTERS

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RINGING CURRENT

NO. 47 RINGING CONVERTER

Requires less than 8 watts to operate.

Will pay for itself in a few months on the saving in power required by other ringing equipment.

Only 3 contacts — wear indefinitely.

— Shipped on 30 days trial —

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TELEPHONE APPARATUS BACKED BY 28 YEARS' SERVICE

Florida Association Renews Conventions

● Rendered keenly alert to all possible indices of the trends of business in general, we may reasonably look to telephone convention activities for an indication of the state of affairs prevailing in the telephone industry. Nor are the observations so made difficult to interpret. After a period of restricted activity and failing attendance which accompanied the recent lean years in the telephone industry, we observe unmistakably healthier signs in a renewal of convention activity, a much increased registration, and, withal, a growing optimism, be it tempered ever so slightly by the perplexity of problems growing out of increased taxation and adverse legislation, both proposed and adopted. These healthier signs are reflected in current reports of telephone conventions published in our trade literature concurrently with statistics from all quarters of station gains, toll improvement and increased earnings.

While this is true for the telephone industry as a whole, it is perhaps more significantly so for the State of Florida where, without the habit of a long train of annual conventions to fall back on, the association nevertheless deemed the time opportune to call the industry together again in a state convention. Tallahassee was chosen as a desirable location and an interesting two-day program, arranged for May 14 and 15, attracted telephone men from the nearby as well as the far-flung vastnesses of the land of perpetual sunshine.

● Tallahassee's natural accommodations were rendered the more inviting by the hospitable and unstinted efforts of the Southeastern Telephone Co. and those attending the convention received the cordial welcome of the association's secretary, C. E. Archer, who proceeded to make them feel at home.

A well-balanced program began in the afternoon of May 14. The meeting was called to order by W. G. Brorein, association president, a telephone man of national reputation whose 35 years in the industry have earned for him the respect of his large circle of friends and the devotion of all those fortunate enough to be associated with him in the business.

Following the invocation by Dr. J. H. Daniel, pastor, Methodist Church, Tallahassee, Mayor J. H. Yaeger delivered an address of welcome which was ably responded to by J. S. Gillentine, general manager, Inter-County Tel. & Tel. Co., Ft. Myers, Fla.

The ladies then withdrew to participate in a traffic conference conducted and presided over by Miss Anne Barnes, travelling chief operator, Iowa Telephone Association.

● The first address of the afternoon was delivered by Dr. Edward Conradi, president, Florida State College for Women located at Tallahassee. Reference was made to the astoundingly rapid advances made in all branches of science during the past half century.

The subject of taxes and their adminstration was next ably handled by A. L. Geiger, general attorney, United States Telephone Association, Washington, D. C., and useful information disclosed concerning "deficiencies", depreciation account pitfalls and other intricacies of practical telephone accounting.

A subject of country-wide interest to telephone men is Rural Electrification, and many are the doubts and fears harbored as to its effects, both inductive and otherwise, on nearby telephone plant. This subject was discussed by J. H. Rouse, transmission engineer, Southern Bell Tel. & Tel. Co.

● To appreciate the difficulties faced by a state regulatory body, coupled with a clear perception of its aims, and to have one's own problems sympathetically understood by that body is to go a long way toward taking the odium out of regulation and establishing a feeling of reciprocal cooperation beneficial to the utility and to the public it serves. It is this spirit of enlightened understanding, that T. T. Turnbull, counsel, Railroad Commission of the State of Florida, delivered his address entitled "The Commission Viewpoint".

● During the evening a banquet was served which afforded ample scope for renewing of old acquaintances and cementing of new friendships. As master of ceremonies W. G. Brorein arose and addressed the gathering with words of friendly welcome, followed by reminiscences of early acquaintanceships and pleasant memories of friends past and present.

The second day's program opened with an address by C. C. Deering, secretary, United States Independent Association on matters of national interest in the industry.

With the authority and calm assurance which bespeak a thorough mastery of the subject, Carl D. Brorein, vice-president and general manager, Peninsular Telephone Co., delivered a clear and instructive resumé of the Social Security Act in its application to telephone companies.

Before adjournment a rising vote of thanks was taken for W. G. Brorein and his associates for their painstaking efforts in arranging so successful a convention. A group photograph was then taken, after which the assembly disbanded with keen anticipation of a reunion in the coming year.

Alabama Association Holds Interesting Convention

● The year-old Alabama Independent Telephone Association held its second annual convention May 11 and 12 in Montgomery. While the attendance was not so large efforts to get those attending the meeting to go out and interest other telephone men in the association and its valuable work were highly successful.

Following the opening of the convention by President C. A. Crenshaw, Fitzgerald Salter, superintendent of the Montgomery Water Works gave the address of welcome which was responded to by Secretary-Treasurer R. H. Liddell of Camden.

Among the speakers at the convention were A. L. Geiger, general attorney, United States Independent Telephone Association, who discussed "Taxes"; J. H. Ralph, Southern Bell Telephone and Telegraph Co., whose subject was "Rural Electrification and Its Effect on Independent Telephone Companies"; C. C. Deering, secretary, United States Independent Telephone Association, who addressed the meeting on "The National Telephone Situation"; S. J. Lloyd, Tuscaloosa who discussed "What the Future Holds for Business."

● Hugh White, chairman, Alabama Public Service Commission, whose subject was "The Commission's Viewpoint" and J. L. Kauffman, commissioner, Alabama Social Security Board, who spoke on "Unemployment and the Social Securities Act as Applied to Telephone Companies."

Major S. G. F. Rathbone, Atlanta conducted a round-table discussion on management, operating and plant problems.

Miss Anne Barnes, chief operator, Iowa Independent Telephone Association, conducted a conference for operators. Miss Sarah Burke, Greenville, spoke on "Local Practices." Miss Burke also won the spell-down contest which was in charge of Mrs. Frank Mack, Greenville. Miss Vivian Calhoun, Natasulga presented a skit written by Miss Barnes.

● The following officers were elected: President, C. A. Crenshaw, Greenville; vice-presidents, W. H. Vaughn, Florala; R. C. Carr, Onconta and R. H. Liddell, Camden; Secretary-Treasurer, J. C. Thomas, Luverne.

COOK CABLE TERMINALS

XB

The universal acceptance of Cook XB terminal was not just an accident, it was the result of the years of successful experience with all steel constructed terminals of the protected type.

The unique method of fastening the cable to the corebox, and the clamp to prevent vibration at the point where cable enters the corebox has eliminated any possibility of leaks at that point.

The terminal is reversible, stub out of top or bottom by simply reversing the hood.

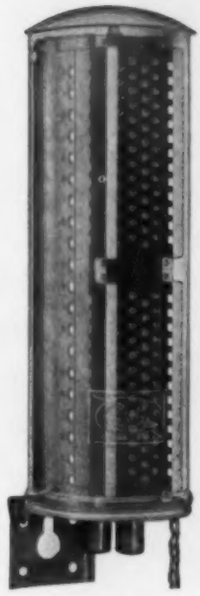
A terminal of exceptional value at a very moderate cost.

M16

A sealed cable chamber terminal arranged for multiple cable nozzles. To be used as a test point for either aerial or underground cable. Full cross connection and drop distribution provided.

An ideal terminal for rural cable between unattended exchanges or as a junction point of aerial and underground cable. Base, corebox and self-soldering nozzles are of steel, formed and hot galvanized. Face plate is of bakelite. Studs, nuts and washers are of Everdur metal. Hood is of steel, hot galvanized.

Made in 11, 16, 26 and 52 pair sizes as illustrated, and up to 404 pairs mounted in pole houses.



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Phillips Cords
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In the new PHILLIPS telephone cord, the outer covering is composed of a material never before used for the purpose. This wiry fabric produces a tougher, longer-wearing braid than anything heretofore experienced—one that adds literally months and years of wear to the useful life of the cord!

Besides this, still further improvement has been effected by laying the conductors flat instead of twisting them together in the usual way—a construction which virtually eliminates kinking. Insulation resistance also has been materially increased by means of a specially-developed process of impregnation.

Here at last in the PHILLIPS cord, is a better cord for every telephone use—one that you are urged to try at your earliest convenience. To order, merely specify number of conductors, length of trim desired. Prices gladly quoted upon request.

●

PHILLIPS PRODUCTS INCLUDE: Bare and Insulated Copper Wires—Rubber Insulated Wires—Enameled Wires—Magnet Wire—Power Cables—Switchboard Cables—Paper Insulated Cables—Flexible Cords—Electrolytic Copper Rods, Shapes, etc.

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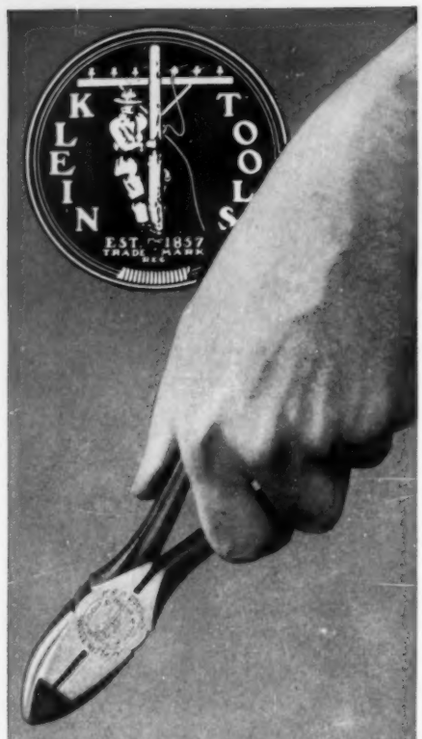

BETTER PLIERS

● Klein Pliers are made for the man who needs or appreciates a remarkably fine tool.

From the careful inspection of the alloy tool steel made to the most exacting specifications—

Through the old craftsman methods of individual manufacturing and individual heat treating—

To the final steps of rigid inspection and testing, each pair of pliers that carries the Klein trademark represents the maximum in plier quality.

Klein methods viewed in the light of modern mass production are necessarily more costly.

On the other hand, for a man who demands a plier of Klein quality there is no way to produce it except the Klein way.

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Optimism Prevails at Kansas Convention

● Optimism over the outlook for future telephone business ran high at the 36th annual convention of the Kansas Telephone Association held May 12 and 13 in Abilene. Enthusiasm was the keynote of the convention and prevailed throughout the two-day meeting.

Fred Coulson, Abilene, vice-president of the association, gave the address of welcome on behalf of the Chamber of Commerce. Response was given by Herb Couch, association secretary.

President Samuel Tucker, Pleasanton, presented his annual address, discussing the problems confronting the small telephone company.

C. W. Wheeler, publisher, Abilene Daily *Chronicle*, addressed the convention on "What I Expect of My Telephone".

● The "National Telephone Situation" was the subject discussed by F. B. MacKinnon, president, United States Indpendent Telephone Association.

M. R. Campbell, Inland Telephone Co., Wellsville, spoke on "Maintenance and Its Importance," in which he pointed out that "we are judged by appearance as well as performance. Replacement of worn or obsolete equipment must not be neglected".

"Rural Electrification" was the subject discussed by M. T. Caster, plant superintendent, Lincoln (Nebr.) Telephone and Telegraph Co. He stressed that rural electrification has been making rapid progress in Kansas. He stated that this movement will keep more people on the farms, improve rural living conditions,' which means better telephone business.

● Fred Coulson presided at the annual association dinner held the evening of May 12, which attracted a goodly numbe rof the attendance.

On the morning of May 13, The United Telephone Co., was host at a theater party. A preview of a feature film, followed by several telephone "shorts" were shown. The closing session of the convention was held in the theater. C. H. Summerfield, Abilene spoke on "Arrangement of the Central Office and Its Public Relations".

Directors elected were C. J. York, Girard; C. A. Ulffers, Kansas City, and R. B. Fegan, Junction City, being relected to the board. Foster Laming, Tonganoxie; E. F. Carter, Columbia, Mo.; Walter Pedigo, Pratt; Fred Coulson, Abilene; J. A. Gustafson, Abilene, and Fred Cross, Wilson, are holdover members. M. R. Campbell, Wellsville; and F. M. Browne, Kansas City, were elected to fill vacancies on board.

● The directors met and reelected all officers of the association. These are: Samuel Tucker, Pleasanton, president; Fred Coulson, Abilene, vice-president; Estelle Henderson, Pleasanton, treasurer; and H. B. Couch, Topeka, secretary.

At a stag dinner the evening preceding the convention prizes were awarded to Frank Fitzgerald, Mamego and Walter Grice, Kansas Corporation Commission reporter, for low and high scores at the annual golf tournament held May 11. H. F. McCulla, Lincoln, Neb., was toastmaster for the occasion.

Dixon, Ill., Company Makes Improvement

The Dixon (Ill.) Home Telephone Co., of which Louis Pitcher is general manager, has a force of workmen engaged in the extension of their underground system of cable lines west of the city limits along the Lincoln Highway. Seven thousand feet of cable is being laid to replace the present pole lines at a cost of more than $2000. The present pole lines will be removed when the work is completed and the improvement will serve to assure better service to the company's patrons and is an extension to the present modern system of underground cable lines.

Telephone Operator Gives Alarm, Saves Store

Alertness on the part of Mrs. Flossie Mathews, night telephone operator at Valdosta, Ga., was instrumental in preventing a serious damage recently when fire threatened one of the city's large mercantile establishments. Mrs. Mathews, on night duty noticed at 2:40 o'clock in the morning that the number of the store had flashed up on her switchboard. Knowing that no one was supposed to be in the building at the time, she notified the police, who found the place on fire. The blaze had caused the telephone to fall, flashing the signal on the operator's switchboard. As a result of her alertness, the fire was soon under control.

Plans have been completed for extensive development of the telephone service throughout Manchukuo. One of the projects contemplated is the construction of a telephone exchange at Dairen, while another exchange, with a capacity of 1,000 lines, will be built at Changchun.

Commercial telephone service between Belgium and Soviet Russia was inaugurated recently.

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From every angle you will find the Nicopress Sleeve the ideal for making the line joints. With these National sleeves the splice is quickly and easily made either in the air or on the ground. All joints have great tensile strength and are absolutely air and moisture proof. If it's a splice make it a National Nicopress.

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"YES, SIR! THESE 'NO-TANGLE' RINGS ARE RIGHT"

Ask anyone who has used them. No tangle Cable Rings are "right" because they are easily installed, will not slip, have a flat, curved surface and are no tangle packed. For time saving, labor saving and maximum satisfaction use No Tangle Cable Rings.

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No. 1000 PROTECTOR

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Novel design features simplify installation of jumpers.

The rigid zinc cover is insulated and can be fastened to the base.

Fuses, carbons and discharge blocks are interchangeable with RELIABLE 977HH Indoor Protector.

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Order One NOW for a 30-day Free Trial

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PRICE $44.00 EACH
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Reliable ringing service is essential in providing satisfactory telephone service.

Use TELERING and provide the MOST reliable service at the LEAST cost.

Current Consumption negligible

Positively No Radio Interference

Directly converts Commercial Alternating Current to Telephone Ringing Current.

You can always depend upon our full co-operation and prompt service.

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More Hours of Service

. . . that's what every telephone engineer seeks . . . *more hours of service* . . . which means fewer replacements, lower service costs! And that's exactly what Ray-O-Vac telephone batteries offer!

For 3 decades Ray-O-Vac batteries have met and exceeded specifications and requirements on every recognized telephone and light intermittent test, and surpass all government standards. For lower service costs, specify Ray-O-Vac!

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Formerly FRENCH BATTERY COMPANY
MAIN OFFICES AND PLANT
MADISON, WISCONSIN
Additional Factories at
Clinton, Massachusetts and Lancaster, Ohio

Southern Indiana Co. to Have New Building, Board

The Southern Indiana Telephone Co., Aurora, Ind., has under construction, at the Lawrenceburg exchange, a new central office building, and will install new switchboard equipment. The building is to be of fireproof construction and is of Early American type of architecture. Provision will be made on the first floor for the operating room and terminal room, operators' rest room, office and a public lobby. An added feature of the operators' rest room is a small kitchenette.

Interior walls will be of eggshell finish enamel tile instead of the usual plastered walls. Contract for the switchboard has been placed with the Stromberg - Carlson Telephone Manufacturing Co. and the plans provide for many new features.

Toll lines will be multipled throughout the board, with busy visual lamps and all positions will be equipped with universal cord circuits so that the answering operator may complete toll calls to all nearby points. The main distributing frame, the line relay rack, power plant panel, and toll test panel will be combined in a single line of equipment, with provision for extensions in the future in the same straight line.

Lawrenceburg has been one of the largest magneto exchanges in Indiana. The new board will provide common battery service. This will necessitate changing a large amount of telephone equipment as well as the installation of the switchboard.

An interesting feature in the make-up of the exchange is the fact that the new central office will be located approximately .8 of a mile from the present central office, which is an exceptionally large change of location in an exchange of 600 lines. This is made necessary by the rapid growth of a section called "Greendale", due to the reconstruction and new construction of several large distilleries.

Durham Company to Spend $60,000

The Dunham (N. C.) Telephone Co. has announced that it will spend approximately $60,000 in the improvement of telephone facilities in the northwest section of Durham.

The improvements will remove many unsightly poles and wires and will enable many subscribers now on party lines to secure private telephones. Private service is now unavailable to many because of overcrowding.

Cable will be laid underground in the strip beneath the sidewalk and the street. In a few places a single aerial cable will replace the network of separate wires now strung on poles.

It is the policy of the Durham Telephone Co. to consolidate wires and to install cables as fast as the growth of the city warrants the step. The company has been cooperating with the Durham Public Service Co. for many months in the consolidation of power and telephone lines where the practice is feasible.

North Carolina Companies Show Increase

The Concord and Hickory (N. C.) Telephone companies reported net profits of $17,889 and $16,565, respectively, on 1935 business, to the State Utilities Commission.

The Concord company reported total revenue of $95,704 and expenses totalling $77,814. The firm paid a four per cent dividend, aggregating $4,800 on its $120,000 capital stock.

Operating exchanges at Concord, Kannapolis, China Grove and Mount Pleasant, the Concord company reported a $243,063 book valuation of its properties. The company operates 3,166 telephones.

The Hickory company operates 1,894 telephones from exchanges at Hickory, Valdese and Granite Falls. Gross receipts of the firm totalled $76,327, expenses $59,662. It paid no dividend on its capital stock of $108,000 and reported a book valuation of $345,312.

Protest REA Lines

Utility lines, constructed in some cases in a rural electrification program, which interfere with telephone service will be protested in a letter to federal officials by the Texas Telephone Association, it was decided at a recent meeting of the directorate. Oscar Burton, Tyler, was in charge.

Armored Bronze Drop Wire Offered by Kellogg

Kellogg Switchboard & Supply Co. announces the development of a new Armored bronze drop wire. It is provided with a "mica-finish", a new material discovery which has the approval of the Utilities Research Commission. Among the many advantages which "mica-finish" gives the new drop wire, the company claims these:

Twenty per cent increased drop wire life, formation of a perfect seal against moisture, reflection of the sun's heat, prevention of softening of insulating compounds, preservation of the wall

thickness of the insulation, elimination of friction between twisted pairs and shielding of braid from wear at the knobs and fixtures.

The new insulation of the wire — known as U. R. C. compression tested stearine pitch "mica-finish" insulation —is claimed to give 20 per cent longer life to drop wire. Being waterproof, mica forms a perfect shield against moisture. Its glazed surface reflects the sun's heat, thus preventing softening of the insulating compounds and preserving the thickness of the insulation.

The mica finish is produced by impregnating the mica into the fibers of the braid. It is mixed with and beat into weatherproofing compounding so that when the saturant penetrates the braid, the mica is carried into the pores. This penetration stops only when the saturant reaches down through the braid to the rubber. Meanwhile tiny scales of mica are piled up and cemented to the outside of the braid, forming a tough, flexible shield in much the same manner as a coat of armor is fashioned by overlapping scales of steel.

Instead of wrapping a tracer cord around one conductor in order to code it, Kellogg's new armored bronze drop wire consists of one wire insulated with white rubber and another insulated with black rubber, it is said. There is, therefore, no possibility of making a mistake in identifying the respective wires. It is also claimed that the elimination of the tracer thread adds to the life of the braid, by the elimination of sharp ridges. The two insulated and braided conductors are twisted together uniformly with an approved right-hand lay. The black rubber used for insulation consists of 30 per cent pure rubber compounded with special anti-oxidants, subjected to a 1500-megohm test, it is said. The white rubber, which also stands up to a 1500-megohm test, has a slightly higher rubber content and is said to equal the black rubber in toughness and tensile strength.

The conductors used in the new armored bronze drop wire are claimed to have 85 per cent conductivity.

The drop wire is delivered in coils of 1000 feet each, with a large 15-inch eye. Both ends of the coil are accessible, each coil being securely bound with tape and wrapped with two servings of weatherproof paper to prevent mechanical injury in transportation.

If Alexander Graham Bell, inventor of the telephone, were alive today, he would be in his nintieth year.

Since the Earliest Days of this Century

WB

Thirty-five years of concentration on the problem of producing the best possible Telephone Wire. Thirty-five years of improving manufacturing methods, of checking and improving construction and materials. Thirty-five years under the acid test of actual use by hundreds of Telephone Companies throughout the world. When you buy Whitney Blake Telephone Wire you buy more than conductor and insulating material.

Telephone Wire

RUBBER COVERED
COPPERWELD - BRONZE - COPPER
DROP - INSIDE and BRIDLE

MANUFACTURED BY

The Whitney Blake Co.

SOLE SELLING AGENTS IN U. S. A.

GraybaR

ELECTRIC COMPANY

FOREIGN DISTRIBUTORS: *International Standard Electric Corporation*, 67 Broad St., N. Y. C.

The DILLON TEMPEROMETERS

Register Correct Temperatures of —

- Paraffin
- Compounds
- Wiping Solder
- Impregnation Wax
- Cable Damming Waxes

THE DELUXE TEMPEROMETER (with dial) registers correct temperatures of paraffin, compounds, wiping solder, impregnation wax and cable damming waxes. Laboratory tests prove that to get the most dependable results these materials MUST be heated to specific temperatures. The DeLuxe not only tells you what these temperatures are, but is the only instrument that actually registers them for you.

THE JUNIOR TEMPEROMETER registers the correct temperature of wiping solder ONLY. Tests made with standard wiping solder composed of 40 per cent tin and 60 per cent lead show that telephone cable joints do not become porous or crystalized when wiping solder is heated to 760° F. when ladling is started over the joints. Under gas pressure tests, joints ladled with underheated and overheated solder proved to be defective.

Prices, Deluxe Model, $6.00; Junior Model, $4.00. FOB Chicago.

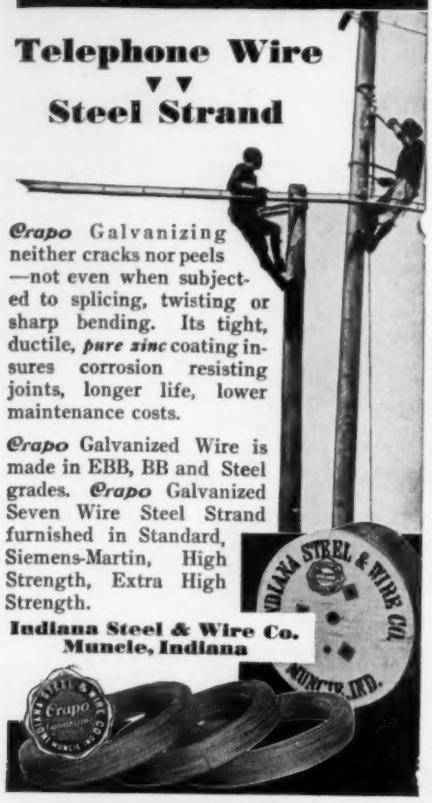
SOLD BY LEADING TELEPHONE DISTRIBUTORS

DILLON MANUFACTURING CO.

63 EAST LAKE STREET CHICAGO, ILLINOIS

Crapo
GALVANIZED PRODUCTS

Telephone Wire
▼▼
Steel Strand



Crapo Galvanizing neither cracks nor peels —not even when subjected to splicing, twisting or sharp bending. Its tight, ductile, *pure zinc* coating insures corrosion resisting joints, longer life, lower maintenance costs.

Crapo Galvanized Wire is made in EBB, BB and Steel grades. *Crapo* Galvanized Seven Wire Steel Strand furnished in Standard, Siemens-Martin, High Strength, Extra High Strength.

Indiana Steel & Wire Co.
Muncie, Indiana

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It's cheaper to buy your subscriber bills by size. Any copy you want. No extra charge for padding, perforating, or punching. Send a sample for prices.

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We operate the largest printing plant in the world devoted exclusively to telephone printing. We have standard forms in stock covering every phase of telephone accounting and office records. We can do your telephone printing better because we know the telephone business.

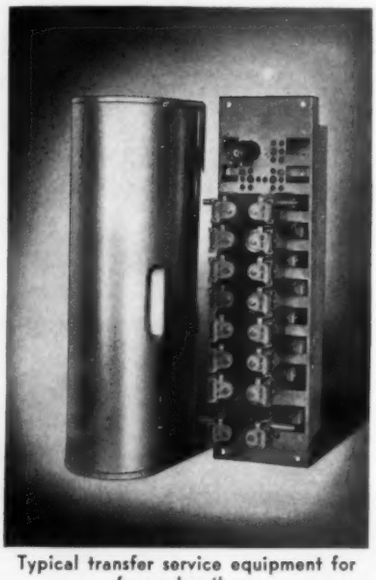
We can save you money — send a sample for price.

See your "Suttle Salesman" for further information.

Suttle Equipment Co.
LAWRENCEVILLE, ILLINOIS

Automatic Offers Subscriber Transfer Unit

Announcement has been made by Automatic Electric Co. of the development of a telephone call transfer unit which is especially adapted to the needs of professional people who have frequent occasion to be away from their regular places of business. The service provided by the transfer unit permits telephone calls made to the subscriber's regular office number to be automatically transferred to his residence telephone at times when the office is unattended, for example, at night and on Sundays and holidays.



Typical transfer service equipment for four subscribers.

Since such a service prevents important telephone calls from being lost, and in many cases saves the salary of an office attendant, it represents an opportunity for extra revenue which should be of interest to all telephone companies.

For each subscriber provided with the transfer feature, a subscriber's transfer unit is installed at the central office and attached to the business line, with jumpers to the residence line. The business telephone is equipped with a switching key. The unit can be used with either automatic central office equipment or with any manual central battery switchboard having the usual three wire circuits with line and cut-off relays.

The operation of the service is as follows:

While the business office is attended, the switching key is left in the normal position, all calls to the business number being intercepted at the office. On leaving the office unattended, the subscriber operates the key. Thereafter, all calls to the business number are received at the residence telephone, but without otherwise interfering with the regular residence service. On returning to his office, the subscriber restores his key, which places the two lines in their original positions. Provision is made so that if an incoming call to the business telephone is being answered at the residence telephone at the time, the transfer unit will not disturb the connection until the conversation has been completed.

The transfer unit consists of a group of four relays and may be mounted in groups of one to four units on a single mounting base. The base is provided with a terminal block, and provided with facilities for mounting on a wall or M.D.F.

Texas Court Rules on Use of Telephone in Race Betting

Article 648 of the Penal Code of Texas provides that "no person . . . . or corporation in any place in this State by pool selling or bookmaking, or by means of telegraph, telephone or otherwise, shall aid or assist any other person in wagering, betting or placing a bet, or in offering to wage a bet or place a bet of anything of value on any horse race to be run, trotted or paced anywhere in this State, or elsewhere". And Article 4664, and Article 4666 of the Revised Civil Statutes of Texas declare same to be a nuisance and authorize the Attorney General to bring suit for the purpose of abating the same. However, a fair construction of these articles are to the effect that in order to constitute a violation of the law same must be knowingly done, ie, the Telegraph or Telephone Company, its agents, servants and employees must, at the time of rendering such service, know that it is to be used for such unlawful purpose. And in this connection, in cause No. 55-963, State of Texas vs Daily Racing Form Publishing Company, Southwestern Bell Telephone Company, A. T. & T. Company, Western Union Telegraph Company, et al, it is recently expressly held "That the American Telegraph and Telephone Company, Southwestern Bell Telephone Company and Western Union Telegraph Company, be and are hereby restrained and enjoined from KNOWINGLY placing or maintaining any of its instruments or equipment upon the premises of any "pool" or "bookmaking" place for the purpose of aiding or assisting in carrying on the business of wagering or betting upon horse races or the results thereof in violation of the laws of the State of Texas; provided, however, that none of said defendants are hereby restrained from installing or maintaining a single line business or residence telephone, unless it has knowledge that such

telephone is or will be used solely for the above described unlawful purposes, and, further, provided that none of said defendants are hereby restrained from placing or maintaining its lines, instruments, or equipment upon the premises of any duly licensed race track if authorized to do so by the laws of the State of Texas, or by the rules, regulations, or permission of the Racing Commission of the State of Texas."

While the above decision is that of a District Court and has not as yet been affirmed on appeal by the Appellate Courts of this State, still in the opinion of the Legal Department of the Texas Telephone Association it is the law.

Knapp Heads Ohio State Life

The directors of The Ohio State Life Insurance Co. have elected Frank A. Knapp, executive vice-president of the company, as acting president to succeed Ulysses S. Brandt, who died May 1. Mr. Knapp is chairman of the executive committee and has served as a director for 25 years.

His home is at Bellevue, O., where he is president of the Northern Ohio Telephone Co. and director in the Union Bank and Savings Co. He is also president of the Farmers and Citizens Bank of Monroeville, O.

$5000 Improvements

Approximately $5,000 improvements will be made in the Waldron, Ark., exchange of the Three States Telephone Co. according to L. L. Thornton, district manager. H. Stone, Skiatook, Oklahoma, will be in charge of the extensive improvements which will include the installation of one and one-fourth miles of new lead cable in the business district. A carload of new telephone poles will be set and the entire outside plant will be rehabilitated. Also the central office will be moved.

Spends $27,000

Workmen for the Lincoln (Neb.) Telephone and Telegraph Co. are busy on new telephone lines which will parallel highways No. 334 and No. 2 west and north of York, Neb. The men keep abreast of the road workers. The cost of changing the lines from York to Hampton will be about $27,000.

The investigation committee (FCC) at Washington is spending the last of its $750,000 and has already discovered that the American Telephone & Telegraph Company is a big business. — *Dallas Morning News.*

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TRUE POSTURE
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Easy
Quick
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A true posture chair designed to increase efficiency, mental alertness, reduce fatigue, improve the health and comfort of the operator.

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WITHOUT PRIVATE BATH FROM $1.50

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FOR EVERY PURPOSE

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for every Telephone Service
THE ELECTRIC STORAGE BATTERY CO., *Philadelphia*
World's largest manufacturers of storage batteries for every purpose.

See Announcement of New Articles on Page 10

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Specializing in Telephone Accounting and Rate Cases Since 1918.
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Pocket Voltage Tester—100 to 500 Volts
Indicates AC or DC and Polarity

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LITTELFUSES

- INSTRUMENT LITTELFUSES, for meters, 1/200 amp. up.
- HI-VOLT. LITTELFUSES for transmitters, etc., 1,000 5,000, & 10,000 volt ranges, 1/16 amp. up.
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- AIRCRAFT FUSES, AUTO FUSES, RADIO FUSES, FUSE MOUNTINGS, etc. Get new Cat. 6.

Littelfuse Labs., 4238 Lincoln Ave., Chicago

Telephone Calls Increase; Errors Decrease

Telephone conversations showed a big increase in number during 1935. Statisticians of the American Telephone and Telegraph Company have completed their survey for the year and have found that the number of completed calls for 1935 averaged 61,085,000 daily over Bell System lines and 14,915,000 over connecting and non-connecting lines, making a total average of 76,000,000 telephone conversations a day in the United States for each day of the past year.

The figures for 1935 show that there were 4.1 per cent more local calls and 4.6 per cent more toll and long distance calls over Bell System lines than in 1934. The average number of out-of-town conversations over Bell System lines in 1934 was 2,176,000 a day, and in 1935, 2,276,000.

During 1935 approximately 83 per cent of all local calls were completed on the first attempt, as compared with 81 per cent in 1929. The fact that the telephone either was busy or was not answered accounted for nearly all the calls not completed immediately.

In the six years that have intervened since 1929, operating errors on local calls have decreased 40 per cent, and dial service has improved through a 12 per cent decrease in irregular uses by the person dialing and a 40 per cent decrease in operating and equipment irregularities. These factors have all contributed to improve in 1935 a service which was good in 1929.

The average time required for long distance connections was reduced from 2.8 to 1.4 minutes and 92 per cent of these calls were handled while the person calling remained at the telephone. This latter figure compares with 71 per cent in 1929.

Reduces Hand Set Charge

The Ohio Bell Telephone Co. and The Cincinnati and Suburban Bell Telephone Co. applied to the Ohio commission for, and were granted authority to reduce the monthly charge for hand set instruments from 25c to 15c and the total charge from $9.00 to $5.40, effective July 1, 1936.

In addition The Ohio Bell Co., supplemented its general exchange tariff with a rule waiving the $1.00 change charge where change from other type to hand set is made with provision that the 15c monthly charge attach.

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Finished Cedar Poles
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Write or telephone for proposition
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Specialists in Appraisals, Rate Surveys, Financial Investigations, Organization and Operation of Telephone Companies
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Absolutely finest workmanship guaranteed

Baked, black, velvet finish, New granular carbon. Workmanship, adjustments and tests made with the latest and most improved apparatus. 50c each less backs. One year money back guarantee.

Full information on request

*** THIS MONTH'S SPECIAL ***

FOR SALE

Dean Four-Party Harmonic Ringing Machine. Double set of contacts, in A-1 shape. Has been giving good service for 20 years and is retired from service only because of change in ringing requirements $60.00

Black Iron Pole Seats, 13 inches wide, similar to Kellogg No. 757 287, F. O. B. Muskegon, Michigan 60c

Rebuilt Magneto Ringer Boxes, inside terminals, 3 bar, 1000 ohm $3.50

Kellogg Line and Cut Off Relays mounted in pairs under one cover, per pair ... $2.50

Battery Cans, 2 cell 60c

Telephone Repair Shop

Operated by Dan'l H. McNulty

1760 LUNT AVE., CHICAGO, ILLINOIS

RECONSTRUCTED EQUIPMENT

Western Electric No. 122 External Post connection receivers less cords @	$ 0.65
Western Elec. No. 250 Local or C. B. Transmitter with back & mouthpiece	1.00
Kellogg No. 301E Self restoring combine line drops and jacks per strip of 10 @	16.50
Western Elec. No.20 C. B. Ind. Coils @ 35c ea. No. 46 @	.55
Kellogg No. 79 C. B. Ind. Coils @	.45
Western Elec. No. 20AL desk stand with W. E. Trans. & Rec. complete with 3 Cond. Cord @	5.25
Chicago Telephone Supply 4-bar 1000-1600 or 2500 ohm ringer compacts @	5.35
Chicago Telo. Supply 5-bar 1000-1600 or 2500 ohm ringer compacts @	6.90
Western Elec. No. 143 Receiver with New shell cord @	1.15
Kellogg No. 41 Receiver with New shell & cord @	1.25
Western Elec. No. 143 3 spring short lever switch hooks @	.75
Kellogg No. 15 3-bar Brass bearing generators complete with crank & screws @	1.85
New Kellogg C. B. or Magneto Grabaphones complete with 3 Cond. Cord less signal sets @	7.25
Western Elec. Cordless Visual signal C. B. PBX board with 7 local lines and 3 trunks complete with desk set Opr. set @	100.00
Chicago Telo. Supply Local Battery Ind. coil 3 connection type @	.35

Write for Bulletin

REBUILT ELECTRIC EQUIPMENT CO.
1940 West 21st St., Pilsen Sta.
Chicago, Ill.

Praises Telephone Industry For Its Progressiveness

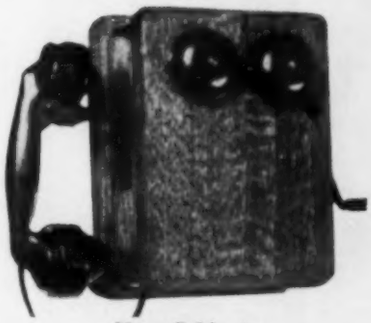
High tribute to its progressiveness was paid the telephone industry by Charles F. Kettering, vice-president of General Motors, in an article entitled "How to Create a Labor Shortage" in the May 30 issue of Saturday Evening Post. Mr. Kettering said:

"The telephone company has a remarkably well-organized process for attacking its problems as they arise or even before they arise. One of my first jobs was with a little telephone company down in Ashland, Ohio, so I am full of admiration for what has been done with the telephone. I remember when it was regarded as a piece of luck if you succeeded in carrying on a conversation across town. Now, I can pick up that instrument and talk to a friend in Paris or London or Madrid, or I can join in a conference with a dozen persons talking from as many different cities. . . . . Those fellows just started in to do certain things and did them. They have accomplished, in the course of two or three decades, improvements that would have come along only after thousands of years if there had not been an orderly pursuit of the answers to the telephone company's problems. They got to be so good on recording and handling sound that when the motion-picture business reached the point where it needed sound, the telephone company just could not keep out of it. Quite without design, they found they had opened up a new field of business.

"Probably many of the telephone company's research discoveries are somewhat out of line with what one might suppose to be their primary purpose. Chiefly they are trying to find out how to give better telephone service, but their scientific exploration into their business future constantly is resulting in valuable surprises. . . . . But you can be sure that before the telephone company got such an organized process for finding out things somebody had to have foresight enough to recognize the present and future problems."

Telephone Equipment (Continued)

MAGNETO HAND SET TELEPHONES



New Cabinets
Reconditioned Equipment
New Leich Hand Set

3 Bar	**$13.50**
4 Bar	**14.00**
5 Bar	**14.25**

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Telephone Department
3530 W. Pierce Street
Milwaukee, Wisconsin

POSITION WANTED

Position wanted by telephone engineer. Eleven years with Bell System. Wide experience in the manufacture, operation and maintenance of telephone equipment. Will go any place. College education. Age 38. Married. Write D. R. D., care TELEPHONE ENGINEER.

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Have detector coil for telling direction and lamp for telling distance to trouble.
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